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An index to the seventy-fifth volume of THE RAILWAY GAZETTE *covering the issues from July 4 to December 26, 1941, has been prepared, and is now available free of charge on application to the Publisher*

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export

Future of British Railways—
Commission Appointed

AS we close for press we learn officially that, on the advice of Sir Ronald Matthews, Chairman of the Railway Companies' Association, a Commission has been set up by the railways to consider the post-war planning and reconstruction of the railways. Sir Ernest Lemon, Vice-President of the London Midland & Scottish Railway Company, has been seconded from duty with that company to become Chairman of the newly-formed Commission. The Commission, which has been inspired by the Boards of the various British railway companies, has been asked to inquire how the efficiency of the railways can be improved in the broadest sense by schemes of post-war reconstruction or reorganisation. We understand that announcement will be made shortly of the names of the other members constituting the Commission.

The New Year's Honours

AMONG recipients of honours conferred by the King in the New Year List are to be found the names of a number of persons representative either of the railway industry at home and abroad, or of other great British undertakings allied or associated with railways. Of the two baronets in the list Sir Ralph Wedgwood receives this honour for the valuable work he has done as Chairman of the Railway Executive Committee, a position he held from just before the outbreak of war until August last, when he resigned and Sir Alan Anderson became Chairman of the Railway Executive Committee, and also Controller of Railways at the Ministry of War Transport. The other baronet is Commander Sir Charles Craven, Controller-General at the Ministry of Aircraft Production, who enjoys high esteem throughout British industry as Chairman & Managing Director of Vickers Armstrongs Limited. Mr. S. R. Beale, who is one of the new Knights of the Order of the British Empire, is a director of the London Midland & Scottish Railway Company, besides being a member of the Industrial & Export Council of the Board of Trade, and Chairman & Managing Director of Guest, Keen & Nettlefolds Limited. One of those receiving the C.B.E. is Mr. G. Ellson, Chief Engineer of the Southern Railway Company, whose honour is awarded for service to civil defence. As will be seen from the extracts given at pages 67-8, all ranks of railway personnel and several parts of the Empire are represented.

The General Public Also Ran

In the recent debate in the House of Lords on the question of railway sleeping berths, reported at some length last week, Lord Balfour of Burleigh, referring to the announcement that the Government had taken control of railway sleeping berths, asked the Minister of War Transport whether he was going to differentiate between the different classes of people who were travelling on Government business. There were also, he said, business people who had important work to carry out for the Government, and, lastly, there were the members of the general public who still had urgent business on which they must travel. The present position was that no member of the public who had not a claim to be travelling on public business could ever be sure of getting a sleeper, which, he contended, was not a good state of affairs, because it might be destructive of public morale, for the public were left with the impression that, however important their urgent affairs might be, they were to be subordinated to the business of "a junior official travelling on, perhaps, routine Government business." Lord Balfour of Burleigh, realising the dilemma in which the railways are placed by the Government prohibition to run more than a rigidly limited number of sleeping cars, made the suggestion that third class cars, accommodating 28 passengers each in four-berth compartments, should be substituted for first class, which accommodate only 10 passengers in single-berth compartments. Lord Leathers promised to give this suggestion sympathetic attention, and while it might alleviate the position, we remain unrepentant in our advocacy that the railways should be permitted to use their equipment at their own discretion. They might be told by the Government to provide a certain minimum number of sleepers for Government purposes, but if they found it possible to supply additional accommodation they should be allowed to do so.

Overseas Railway Traffics

For the 24th, 25th, and 26th weeks of the current financial year, the traffic receipts of British-owned railways in Argentina have, with few exceptions, shown an improvement over those for the corresponding period of 1939-40. The best result is that of the Buenos Ayres Great Southern, with an increase of 1,291,000 pesos for the three weeks, followed by one of 332,050 pesos on the Central Argentine. Three weeks' receipts on the Argentine North Eastern and the Entre Rios show advances of 69,800 pesos and 57,100 pesos respectively, but the Buenos Ayres Western shows a net fall of 21,000 pesos.

Antofagasta traffics for the 52 weeks to December 28 show a gain of £132,680, and the drop in sterling receipts for the 52 weeks of the Great Western of Brazil to December 27 has been reduced to £20,300, while currency receipts show an improvement of 500 contos.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres and Pacific* ...	26th	1,428	+26	34,063	+3,699
Buenos Ayres Great Southern*	26th	2,655	+470	57,853	+7,036
Buenos Ayres Western* ...	26th	755	−73	21,525	+3,790
Central Argentine*	26th	1,718	+309	45,789	+9,526
		£	£	£	£
Canadian Pacific	52nd	1,401,600	+405,600	44,289,200	+10,096,200
Bombay, Baroda & Central India	38th	347,325	+38,250	7,750,125	+643,425

* Traffic returns in thousands of pesos

Gross earnings of the Canadian Pacific for the first eleven months of 1941 amounted to £40,048,400, an increase of £9,122,600, and the aggregate net earnings of £8,173,400 for the same period showed an improvement of £2,006,800.

South Indian Railway

This company's share of surplus profits for the twelve months to March 31, 1941, amounted to Rs. 5,95,482, the highest since the year 1928-29, but no distribution was made to stockholders out of these profits for the year under review. Income tax adjustments with the authorities, however, made the guaranteed interest payment of 3½ per cent. equivalent in effect to a tax-free distribution. Coaching earnings showed an improvement of Rs. 12,60,250 and goods traffic receipts were Rs. 44,69,553 up.

	1939-40	1940-41
Passengers carried	50,573,183	52,248,825
Public goods traffic, tons	3,309,564	3,444,883
Operating ratio, per cent.	60·23	52·41
	Rs.	Rs.
Gross earnings	5,07,00,168	5,65,49,873
Expenses	3,05,35,060	2,96,35,727
Net receipts	2,01,65,108	2,69,14,146

The reduction in working expenses was Rs. 8,99,333, or 2·95 per cent., notwithstanding the increase of Rs. 58,49,705 in gross earnings, but it must be borne in mind that, in a measure, the high figure of surplus profits was due to the decrease in the amount spent on replacements and renewals, which will have to be made good after the war. The Shoranur-Nilambur line was dismantled during the past year, and the Madura-Bodinayakkanur branch was due to be closed on January 1, 1942.

Making Up Lost Time

The run from Crewe to Carlisle described on page 72 is a cheering evidence of the fact that there are still plenty of drivers who, despite the discouragement of frequent and severe—and at times not altogether excusable—signal checks, are determined to do their utmost to keep their trains to the paths laid down for them in the timetables. The driver on this particular journey recovered no less than 25 min. on a journey of 141 miles. What in this country is generally a pleasant and stimulating surprise is in the United States a matter of custom—a matter, indeed, in which engine crews have no option. In the November-December issue of the *Railroad Enthusiast* a contributor describes a vacation round trip from New York to Seattle and back, in which nine railways were concerned, and it is one long record of recovered time and punctual or early arrivals. For example, the 17-hr. all-coach Pacemaker of the New York Central from New York reached Chicago 12 min. early; the high speed Hiawatha of the Milwaukee was 3 min. early into Minneapolis; the easily-timed Olympian of the same company, 30 min. late out of St. Paul by connections, and as much as 90 min. late *en route*, was only 35 min. late by Spokane and on time at Seattle. So it went on until the writer boarded the Pennsylvania's 17-hr. Chicago—New York Trail Blazer at Pittsburgh 48 min. late, 37 min. of which was recouped on very fast schedules thence to New York, which was reached only 11 min. behind time.

Wooden Electric Coaches

A number of American interurban electric lines still use cars with all-wood bodies, without even thin steel sheathing, both as single-unit motor-coaches and in multiple-unit trains. Most of these electric lines are growths from tramway or street railway systems, but quite a number are proper electric railways. The Pennsylvania-Reading Seashore Lines, for example, still use wooden cars as the make-up of four-coach trains on round trips between Camden, N.J., and Millville. Another electric line still using long bogie wooden motor-coaches with overhead current collection by trolleys is the 23-mile Aroostook Valley Railroad, a feeder of the Canadian Pacific Railway located in the State of Maine, U.S.A. The Atlantic City & Shore Railroad and the Chicago, Aurora & Elgin have similar cars in fairly fast service. The bigger electric interurban lines, first class examples of which are the Chicago, North Shore & Milwaukee, and Chicago, South Shore & South Bend, which operate schedules considerably in excess of 60 m.p.h., have been scrapping their wooden stock, and use mainly all-metal cars, although still with the overhead trolley low-tension d.c. collection, which is a relic of the early days of street railways and the time when F. J. Sprague was introducing multiple-unit traction on such lines.

Southern Railway Blast Pipe Experments

Locomotive engineers and others who make a study of locomotive practice, and therefore appreciate the importance of draughting and front-end arrangements generally, will appreciate the candour with which the results of the Southern Railway blast-pipe experiments are set out in the table accompanying our article at page 50. It is frankly disclosed that several of the experiments gave unsuccessful results, some indeed falling short in efficiency and being described as "definitely inferior" to that of the arrangement used in the "Lord Nelson" class engines as originally designed. All the more satisfactory is it therefore to note that after many vicissitudes and a lot of patient and skilful research the results ultimately attained are described as entirely satisfactory and superior to the original standard. The engines of the class referred to are sixteen in number, and were built between 1926 and 1928. Mr. Maunsell, then Chief Mechanical Engineer, provided an engine which gave a satisfactory performance with the heaviest and fastest trains then running. In more recent years, however, the trains grew heavier and higher speeds were demanded. Mr. Bulleid, the present Chief Mechanical Engineer, thereupon sought means of augmenting the evaporative capacity of the boilers, and at the same time of raising the efficiency of the engines by reducing back pressure in the cylinders. To this end he put in hand a series of front-end experiments in 1938, which are described in our article.

More American Speed

Three operating developments of interest have appeared in American timetables this autumn. On the Pennsylvania, where national defence requirements have necessitated a considerable increase in the already dense electric service between New York, Philadelphia, Baltimore, and Washington, every Friday the eastbound Congressional is being operated in two sections from Washington to New York, the first of which is booked non-stop over the 174·5 miles from Baltimore to Newark in 155 min.—a remarkable average of 67·5 m.p.h. over an extremely busy route. This train for the first time brings New York within 3½ hr. of Washington, 224·6 miles distant. Another Pennsylvania alteration of note arises from the insertion of stops at Gary in the schedules of the two daily Chicago-Detroit flyers in each direction. As a result, over the 123·0 miles between Gary and Fort Wayne, there are now, with steam power, one run in 96 min., two in 97 min., and one in 98 min., at start to-stop averages of 76·9, 76·1, and 75·3 m.p.h. respectively. A new record for non-stop running with steam, for the United States, has also been established this year by the Louisville & Nashville Railroad with the South Wind, one of the co-operative all-coach flyers established by a number of companies to provide a daily service by three different routes, turn and turn about, between Chicago and Miami. This covers the 205·1 miles between Nashville and Birmingham non-stop in 3 hr. 44 min. southbound and 3 hr. 33 min. northbound, the latter average

of 57·8 m.p.h. being particularly praiseworthy over a route that is more than half single track. Also this winter the principal diesel-hauled streamliners between New York and Miami are coming down to 24 hr. runs over both Atlantic Coast and Seaboard Air Line routes, 1,328 and 1,368 miles in length respectively.

Signalling a New Connecting Line

The various works necessary to adapt the railways to the needs of the war effort are often of much interest to the signal engineer. Many of the schemes that have been sanctioned have been made possible by improvements introduced since the last war, such as the long-distance operation of points, without which many additional signal boxes would have had to be erected and, of course, staffed. The shortening of block sections is now readily accomplished by intermediate signalling, and with greater safety than under older methods. Elsewhere in this issue will be found a description of some interesting special work covering a set of connecting lines at an interchange point between the Great Western and Southern Railways. By fixing a small electric power frame in an existing mechanical signal box, electrically interlocked with the ordinary lever frame, an arrangement that would not even have been contemplated at one time, the points and signals in the area now dealt with from the box have been simply and effectively controlled.

A Collision in C.T.C. Territory

A collision reported in the American press as having occurred in a C.T.C. area at Leavenworth, Kansas, on March 26, 1941, in which the driver of a Missouri Pacific freight train failed to obey caution and stop signals properly, and collided, though at very low speed, with a Chicago Great Western train at the fouling point of a turnout, draws attention to the question of signal spacing, which is much in evidence in the U.S.A. at present. The official report points out that proper braking distances, considering the speeds there authorised, are not available in many cases in the district. In this instance the signals could be seen at a considerable distance, for the weather was quite clear, and should have been obeyed more efficiently. The fact that C.T.C. was in use had no bearing on the case, which is another instance of what we seem to have noticed rather frequently in the American accident reports, thoughtless driving after signals have been seen and recognised. Misreading of signals is understandable, in a sense, but there have been many cases of late years of driving carelessly after a warning has been distinctly recognised.

Wood as Locomotive Fuel in Sweden

Due to the drastic shortage of coal, the steam-operated railways in Sweden—both State and privately owned—have had to resort to the extensive use of wood as locomotive fuel, and wood-fired locomotives are now a common sight on all the secondary lines. Wood-firing has brought many inconveniences, among them the reduction of train speeds and consequent lengthening of travelling times. The latter are further lengthened by the necessity for longer stops at stations to enable the wood to be loaded on the tender. To ease the operation of trains hauled by wood-fired locomotives, the reduction of the train weights has become imperative, which has necessitated the withdrawal from circulation of many buffet cars, and of the larger and heavier types of vehicle, namely, the modern all-steel carriages. All these have been replacd by lighter but older types of carriage affording less passenger comfort. An example of how wood-firing influences the journey time of trains is afforded by the through stopping trains on the cross country main line connecting Gothenburg, on the west coast, with Karlskrona, on the south-east coast, a distance of 352 km. (219 miles). To cover this distance now takes the fastest through passenger train hauled by a wood-fired locomotive 10 hr. 20 min., or 1½ hr. longer than previously, when coal-fired locomotives were in use.

Madras & Southern Mahratta Railway

THE length of railway open to public traffic at the close of the year to March 31, 1941, was 2,939 miles, including 2,804 miles (1,092 broad gauge and 1,712 metre gauge) company and State lines, and 135 miles (31 broad gauge and 104 metre gauge) worked lines. These figures include 4 miles of quadruple and 50 miles of double line. The Cocanada-Kotipalli branch (27 miles) was closed to traffic during the year. Gross earnings of company and State lines during the year under review amounted to Rs. 813·28 lakhs, an improvement of Rs. 48·24 lakhs. In the company and State lines' working expenses of Rs. 420·93 lakhs there was a reduction of Rs.7·85 lakhs, leaving net earnings Rs. 56·09 lakhs higher, at Rs. 392·35 lakhs. Following on an improvement of Rs.29·26 lakhs in the previous year over 1938-39 and an improvement of Rs. 20·93 lakhs in 1938-39 over 1937-38, the results for the year under review may be regarded as satisfactory. Net earnings from worked lines for the year under review were Rs. 11·17 lakhs against Rs. 11·64 lakhs in the previous year.

Coaching traffic earnings of company and State lines were Rs. 27·15 lakhs more than in the previous year, chiefly due to levy of the supplementary charge throughout the year against one month only in the previous year and to heavy bookings of military personnel. There were, in addition, increased bookings of upper class passengers to hill stations due to restrictions on travel to the United Kingdom, and some reduction in competitive motor road transport. Parcels earnings improved by about Rs. 4·50 lakhs. Although total earnings from goods traffic increased by Rs. 17·7 lakhs, the weight carried decreased by 275,000 tons, or 4 per cent., but ton-miles worked were slightly more. Earnings from public coal and coke were double those of the previous year—Rs. 28·89 lakhs against Rs. 13·87 lakhs—and 184,000 tons more coal was carried, an advance of about one-half, and ton-miles increased by 110 million, being 2½ times as much as in 1939-40. The increase was chiefly due to the levy of a surcharge throughout the year and to the carriage by railway of coal which formerly followed the sea route. In general merchandise traffic earnings the net increase of Rs. 3·15 lakhs is attributed chiefly to the levy of a supplementary charge. The weight, ton miles, and earnings from military traffic were trebled.

	1939-40 Rs. lakhs	1940-41 Rs. lakhs
Coaching earnings	248·15	275·30
Goods earnings	531·55	548·62
Gross earnings	792·27	837·17
Working expenses	444·37	433·65
Net earnings	347·90	403·52

In the cost of general administration there was a further small but satisfactory decrease. A small increase of Rs. 0·87 lakhs in repairs and maintenance is creditable in existing war conditions, and the decrease of Rs. 1·71 lakhs in operating expenses with earnings expanded by Rs. 45 lakhs is very satisfactory. In replacement and renewal expenditure the decrease of Rs. 9·74 lakhs was chiefly in reduced relaying of track due to non-receipt of material and to the diversion of material for war purposes. For the whole system the operating ratio was 51·80 per cent., against 56·09 per cent.

Conserving Passenger Goodwill

AT present, and probably for a long while to come, the primary function of the British railways must obviously be the most efficient handling and movement of essential war traffic. To that end all else must be subordinated and if in that process passenger amenities have to be curtailed still further—they have been recently reduced—there will be few who will deny the overriding necessity of meeting wartime exigencies at the expense of personal comforts. Nevertheless, it is of paramount importance that whenever changes have to be made which affect adversely the great potential travelling public due care should be taken to explain clearly the need for the altered conditions and that shelter should not be sought behind the platitudinous and unsatisfying phrase "There is a war on." No-one in Great Britain is unaware of that fact, but there may still be some who do not appreciate to the full the weight or variety of the vital demands which are made on the railways, and the meeting of which preclude the maintenance of the high standard of amenities proferred

passengers in normal times. It is of great moment that this should be fully understood by the public if the railways are to maintain the incalculable asset of goodwill, the importance of which we have emphasised on many occasions in these columns.

In this connection part of an editorial article in a recent issue of our American contemporary, the *Railway Age*, published shortly before the entry of the United States into the war, has a number of points which merit attention by those who have assumed control of the railways in this country and who, therefore, are responsible for their ultimate wellbeing. The article points out that the improvement in passenger services in America has had a by-product of great importance and that it is vital to the future of the railways that the public shall believe that they are efficiently and progressively managed. A preliminary report by a business research organisation which has made a comprehensive survey of public opinion as to the railways indicates that there is now criticism by a small majority only of railway managements for operating inefficiency and lack of foresight.

Eighty-two per cent. of the persons interviewed were able to mention one or more specific improvements of which they were aware. Most of them, however, limited their comments to five major features that have impressed them :—

(1) Faster, larger, more powerful locomotives ;
(2) Streamlined trains ;
(3) Diesel power or electrification ;
(4) More comfortable and attractive coaches ; and
(5) Air conditioning.

It is significant that all these improvements have been made partly or entirely in passenger service, and that they are all of kinds that made a physical impression of one sort or another on the observer. Only a small minority made any voluntary mention of reduced fares, better dining car service, increase in safety, improvements in freight service or equipment, better roadbeds, or other things of perhaps equal or greater importance from a railway standpoint and to the public. It was things that an overwhelming majority could see and feel that had influenced their opinion. This is a fact of great significance that should be highly influential in determining railway policies affecting service and public relations activities. If the railways are to have a prosperous future they must favourably influence the opinion of the masses ; for the masses now, because of their political power, exert a preponderant influence on government policies that more vitally affect the railroads and every other industry than ever before. The masses are not intelligent, do not reason, and must be influenced by what they can see and feel. Therefore, it is essential to a prosperous future for the railways that they shall constantly influence the masses through their sight and feelings.

Corrosion—An Insidious Enemy

IN Western Pennsylvania, at a small town called Greenville, there was established in 1912 a company for the rebuilding and repair of all-steel freight cars; the Bessemer & Lake Erie RR., which was the first in America to use all-steel stock, had its shops in the same town. An acre and a half of the site was laid with tracks on which crippled cars were dismantled, and as this was before the days of cutting torches, rivets were cut out with cold chisels and 8-lb. sledge hammers, handled by men appropriately known as "car whackers." Not only did their energetic whacking release the rivets; it also shook off the rust flakes from the body sheets, and in such quantities that it became necessary from time to time to pack up the tracks clear of the rust bed. Rather more than ten years afterwards cutting torches came into use, and the dismantling yard was then devoted to stowage; later, on some additional steel storage space being needed, the rust deposit was dumped into a neighbouring swamp to reclaim the land. Later still came the demand for ferrous oxide, rust which was clean enough to adhere to an electric magnet bringing in from $2 to $4 a gross ton. As a result, 3,000 tons of the rust was salvaged and shipped to a neighbouring blast furnace, and no estimate is possible of the dumped rust that was still engulfed in the swamp. The moral of this story lies not in an admirable piece of salvage work, but in the fact that corrosion could account in little more than ten years for the distintegration of 3,000 tons and more of the modest proportion of a nation's freight stock that was handled at one single wagon repair depot.

Corrosion is, indeed, one of the worst enemies of the railway engineer, and it is doubtful whether even yet the fact is fully realised. A forceful article in the August 2 issue of our American contemporary, the *Railway Age*, drew attention to the neglect of mechanical engineers in that country to make adequate use of modern corrosion-resisting steel alloys in their freight car construction; the author calculated that if the 270,000 wagons which, it is estimated, will be built for American railways during the next two years were to be constructed of such alloys, a saving of 604,800 tons of finished steel would be effected. Not only so, but largely in order to provide more ample resistance to corrosion, the tendency has been to use heavier plates and sections in wagon construction in the U.S.A., and this factor has been mainly responsible for an increase in the proportion of tare to paying load, since the introduction of all-steel equipment, from an average of 1 to 1 to something like 1½ to 1. This use of high tensile corrosion-resisting alloys, though entailing greater initial expenditure, has the double advantage of reducing tare and increasing life. The writer of this article also blames American steel manufacturers in failing to agree jointly to market a limited number of approved high tensile alloys, rather than making competitive claims for their individual proprietary brands, and regards this lack of co-ordination as in part responsible for the scepticism of railway mechanical engineers concerning the merits of such alloys. In some cases, such as that of the open top coal car, atmospheric corrosion is aggravated by chemical constituents in the coal itself, particularly when, as in the U.S.A., the cars are used at times for the storage of coal over considerable periods in humid conditions. Instances have been known of new steel sheets in all-steel cars having been penetrated by corrosion within nine months, and the average life of the first American all-steel freight stock was only eight to twelve years. This life has now been increased, but, as already explained, at the expense of tare weight.

The engineer responsible for way and works maintenance is a still worse sufferer by reason of corrosion. It is a matter for conjecture as to the saving that might have been effected in the maintenance of such a structure as, say, the Forth bridge, had it been fabricated from modern high tensile corrosion-resisting alloys; the gain would have been double, as the greatly reduced amount of steel in the structure would have required considerably less frequent attention, and it is probable that this material reduction in maintenance cost would have more than balanced the increased interest on capital cost. The Storström bridge in Denmark is a remarkable modern example of the use of special steel whereby not only the amount of metal used but the upkeep have been minimised. One particular bugbear of the railway civil engineer, from the corrosion point of view, is the steel rail when laid in tunnels, and particularly damp tunnels in which sulphur from locomotive exhaust combines with moisture to form weak sulphuric acid. In many such tunnels the life of rails averages no more than three years, and premature removal is often necessary because corrosion fatigue has attacked the rails at the joints, and caused cracks to develop in the fishing. Neither copper nor chromium appear to have any advantage as corrosion-resistants in high-carbon rail steels, and until now we have got no further than the old time expedient of painting the rails to secure some prolongation of their life, though with some more scientific precautions than heretofore in the selection of the coatings. But the problem of the tunnel rail is as yet far from any satisfactory solution. An interesting experiment recently initiated in America, and based on the fact that under-water corrosion is electrolytic in its action, is the cathodic protection of steel water tanks by means of submerged electrodes charged with direct current, and designed to protect the shell of the tank with an insulating film of hydrogen; the method is described on page 580 of our issue of December 5 last. There is now in existence in this country a representative committee of engineering interests, including the railways, on corrosion, and the importance that attaches to its work needs little stress.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Calling-on, Draw-ahead, Shunt-ahead, and Warning Signals

London, E.4
January 1, 1942

TO THE EDITOR OF THE RAILWAY GAZETTE.

SIR,—Your correspondent, in your issue of December 12, has raised an interesting question. He rather brushes on one side any idea of a double-box station affording an example of a situation where a home signal is a section signal, but neverthess it does. Also, although he intentionally or unintentionally gives the impression that the calling-on signal was prior to 1937 used only to allow a train to enter an occupied station platform, there were cases where it was used to beckon a train into a *clear* section or *out of* a station, and there was and is nothing in the wording of the relative rule definitely prohibitive against this use. It is submitted therefore that the 1937 alterations to the Rule Book constitute in effect not so much a reversal of principle as an amendment necessitated by an extension of the use of the calling-on signal for permissive goods lines when occupied, such situation having largely arisen in consequence of the abolition of a number of signal boxes.

The 1937 Rule Book alterations appear to have been partly made to cover cases within one-box limits where sometimes the section is clear and at other times occupied, and but for the introduction of the drawahead signal either separate subsidiary signals lettered "C," "S" or "W" (or an indication showing one of these letters coupled with the pulling off of the subsidiary signal) would be required. To avoid this complication and expense, the introduction of the common purpose drawahead seems to have been justified, but at the same time it was apparently thought that valuable time would be saved, where the circumstances warranted it, by telling a driver the section was clear and that a "W" might then be used. Surely what must have been in mind when deciding to retain the letters "C," "S" or "W" under section signals was that the trend of modern signalling was all towards making double-box stations into one-box stations, and that the restricted use of these lettered signals would—to keep in step with this trend—be largely confined to leading on to what your correspondent refers to as "open line" where the conditions under, or purpose for, which the movement was being authorised to pass the section signal would not be varied. In other words, where the section was of some length, a lettered subsidiary signal was to be used, but where the section was short there was generally speaking no need for a letter.

There is one point your correspondent has not made in favour of his proposed comprehensive rule which drops the common purpose drawahead, and that is that if a calling-on signal were always used to enter an occupied section, whether controlled by two boxes or wholly from one box, a driver would know that the pulling off of the next signal ahead did not apply to him but that he must look for a tail lamp as his stopping point.

Your correspondent also states that the need for a "W" signal under a signal not controlling the entrance to the section ahead does not seem particularly pressing, but how otherwise in ordinary mechanical signalling installations are points closely in front of the stop signal ahead to be free for use simultaneously with the pulling off of the stop signal controlling movements up to that stop signal ahead?

Regarding the point raised that there is no definition in the Rule Book as to what does or does not constitute the "section ahead," this would be a justifiable criticism if the Rule Book were a students' text book, but it is not so much that as a description of safety methods, etc., to be observed by staff familiar with railway conditions.

Yours faithfully,
IXION

R.O.D. Locomotives

Koyama,
West Cliff Road,
Bournemouth
December 21

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I was greatly interested and may I say pleased to see the illustration in THE RAILWAY GAZETTE of the original (2-8-0), which I designed two years after joining the Great Central Railway, of which some hundreds have been constructed since. During the last war I received orders from the Government to forward complete drawings to five firms, and no less than 510 locomotives were constructed under my inspection and sent to France. All returned after the war and were disposed of to various railway companies. The remarkable thing which strikes me so forcibly is that a large number of these engines according to THE RAILWAY GAZETTE have been sent to the Middle East. I have received letters of congratulation from old railway friends that these "veterans," as one Yorkshire friend has called them, are still able to render good service.

Yours sincerely,
J. G. ROBINSON

[It is interesting to recall that some of these locomotives (illustrated on page 53) were completed too late for war service overseas, but were set to work immediately in this country. Although most of them were shipped back to England after the war, where some were set to work on the L.M.S.R. and G.W.R., as well as the L.N.E.R., others were eventually sent to China and worked on the Shanghai-Hangchow-Ningpo Railway; others again were purchased for use in Australia. In every sphere of their varied activities they earned a well-deserved reputation for reliability.—ED., *R.G.*]

PUBLICATIONS RECEIVED

British Standards Institution Handbook of Information, including Annual Report 1940-41 and Indexed List of British Standards, July, 1941. London: Publications Department, British Standards Institution, 28, Victoria Street, S.W.1. 8¼ in. x 5¼ in. 172 pp. Paper covers. Price 1s. 6d. net.—The amazing ramifications of the B.S.I. are covered in the issue of the handbook which has just been published, and which includes not only a précis of the organisation and the composition of the general council and four divisional councils, but also a complete list of B.S.I. specifications including those dealing with A.R.P. There is a comprehensive inter-specification cross-index, a subject index running to approximately 1,300 entries, a report on the work of the building, chemical, and engineering divisions in 1940/41, and the annual report for the same period. New or revised specifications issued during the year include that on traction motors (B.S. 173); a draft revision of B.S. 163, steel wire strand for Railway Signalling Purposes, has been approved for circulation for the technical comment of the industry.

Canada's Guests.—Issued by the Canadian Pacific Railway. We have received this brochure, which is the fifth to be issued since May. It contains a number of photographs of the activities of young evacuees from this country at present in Canada, and gives an excellent impression of the hospitality which is being extended to them by their Canadian hosts. It has had an enthusiastic reception by parents, relatives, and friends of children sent to Canada for their welfare in wartime.

A Yearbook of Railroad Information: 1941 Edition. Published by the Committee on Public Relations of the Eastern Railroads and also prepared by the Western Railways' corresponding committee. 6 in. × 4 in.; 96 pp. The avowed object of this booklet is to publish facts about the American railroads in handy pocket form. The information is mainly statistical and much of it shown by graphs, both financial and operational fields being covered. Improved operating efficiency in the past 19 years is, for instance, emphasised. Train speeds and loadings are included. Most of the figures are obtained from the Interstate Commerce Commission's official publications or from the Bureau of Railway Economics.

Rubber.—An unusual circular chart entitled "Rubber Data for the Engineer," sent by the British Rubber Publicity Association, of 19, Fenchurch Street, London, E.C.3, gives the characteristics of rubber of nine general types or purposes.

Cubicle Type Switchgear. — The English Electric Co. Ltd., of Stafford, has sent us a copy of Publication Z13, describing English Electric cubicle-type switchgear, which is of sheet-steel construction, and is normally arranged for indoor service. The gear is so designed that the space required for installation and operation is reduced to the minimum, and it can be supplied to meet the requirements of any normal high- or low-voltage scheme. In certain instances it can be made suitable for outdoor use.

THE SCRAP HEAP

Mr. F. R. E. Davis, Secretary of the Great Western Railway Company, is often mistaken for Lord Simon. At Paddington today a West Country M.P. nudged me in the ribs and, nodding towards him as he was watching the flow of traffic to the platforms, asked: "Has the Lord Chancellor come here to see how the public are disregarding the Government appeal to cut out Christmas travel?" The M.P. was surprised when I pointed out his error.—*From the "Star" of December 22.*

* * *

WOMEN RAILWAY WORKERS 25 YEARS AGO

The Railway Director at Danzig has issued the following order. It has been noticed that the female employees on the railroads do not always take their work earnestly enough, nor does their exterior seem above approach. All women wearing railway uniform, and also those only entitled to the uniform cap, must now greet their superiors in military fashion by putting the right hand to the headgear.—*From "The Glasgow Herald."*

* * *

SOME CURIOSITIES FROM AUSTRALIA

No. 57, an "O" class 0-6-0 Victorian Government Railways locomotive was built in 1862 by Robert Stephenson & Co. Ltd. for main-line working to Bendigo and Ballarat. Just 50 years later it was sold by the Railway Department and was subsequently installed to engine the wooden 116-ton paddle steamer *Canally*. This vessel had a length of 92 ft., beam of 21 ft., and depth of 6·3 ft., and her venerable engines are now being broken up at long last. Meanwhile, No. 57's tender had other experiences.

The first railway in Tasmania from Launceston to Deloraine—known as the Launceston & Western Railway—was originally of 5 ft. 3 in. gauge, and in 1869-70 four 4-4-0 tank engines, Nos. 1 to 4, were ordered for it, also from Stephensons. In 1888 the line was purchased by the Government and converted to 3 ft. 6 in. gauge, with the result that the four engines became surplus and were transferred to the Victorian railway system. No. 4 went to Koondrook in 1895 and was not broken up until 1922. During part of the intervening period No. 57's tender was attached to No. 4.

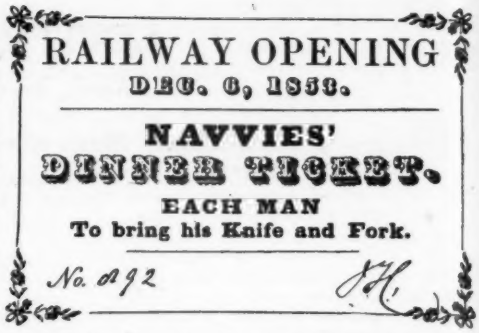
Meanwhile, No. 2 was found working a stone-crusher in connection with the construction of the Yarra tunnel works and Spottiswood pumping station of the Melbourne Metropolitan Board of Trade. It still bore the inscription L. & W. Ry. No. 2 and Stephenson's works number 1915.

* * *

Charles Dickens's family resided near the site of the Railway Clearing House premises about 1825. St. Mary's Church, opposite the R.C.H., was attended by Dickens as a boy. It is recorded that a Dr. Danson, who was one of Dickens's school-fellows, went with him one Sunday morning to this church and declared that "Master Dickens did not attend in the slightest degree to the service, but incited me to laughter and in fact behaved in such a manner that it was lucky for us that we were not ejected." Dickens was at one time President of the Railway Benevolent Institution.

* * *

In 1767 a navigable canal was projected, to pass from Stockton to the extensive inland collieries of Etherly and Witton Park; but, for reasons not explained, the undertaking was abandoned. The desired communication has, however, been effected by a rail-way, or tram-road, extending a considerable distance, and having several branches to Yarm and other places. The original work was completed in 1825, under the authority of an Act of Parliament, and is the joint property of a number of shareholders. Coaches, drawn by horses, travel daily over this road, from Stockton to Darlington, at the rate of about nine miles an hour. Locomotive engines are employed for the transit of coal, lime, lead, etc.; and other engines are stationed on the line, to assist the loaded waggons in their passage across the elevated portions of the road. The utility of this communication is evidenced by the number of carriages which are constantly traversing it, laden with passengers and merchandise. —*Extract from "Westmorland, Cumberland, Durham, & Northumberland, Illustrated," by Thomas Rose. Published by Fisher, Son & Co., London*, 1832.



Dinner ticket from the collection of the late Mr. E. F. Bulmer, of cyder fame, issued in connection with the formal opening on December 6, 1853, of the Newport, Abergavenny & Hereford Railway to Hereford

* * *

Le Havre owes much to Robert Griffiths (1805-83), the Welsh inventor, from the Vale of Clwyd. He invented a riveting machine in 1835. About 1840 he crossed over to France and settled at Le Havre, where he established ironworks. The greater part of the rails used for the construction of the Le Havre—Paris railway were manufactured at his works.—*From the "Western Mail."*

* * *

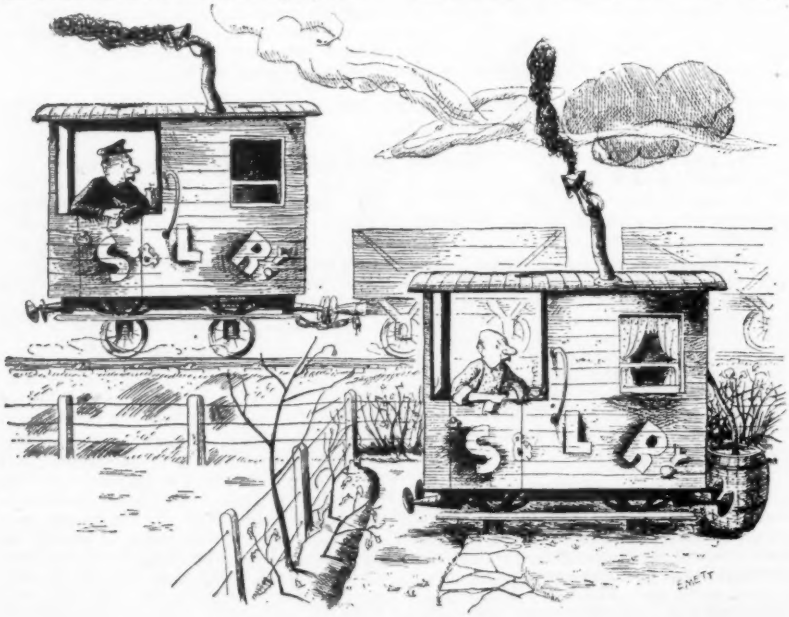
For the theft from railway wagons at the docks of 1,079 lb. of cheese and 899 lb. of jam and marmalade, seven men were each sentenced to six months' hard labour at Bristol recently. For the prosecution it was stated that this was the first time it had been possible to bring before the Court men who had been responsible for stealing food—and rationod food at that—in such enormous quantities from the docks.

* * *

A correspondent writes:—"When I first glanced at the illustration on page 662 of your issue of December 19-26, showing a woman employee of the L.M.S.R. riding a bicycle immediately across the path of a locomotive, I was alarmed, as it seemed most probable that she would be run over by the engine. If that had unfortunately happened, would it not have been a case of 'knock'er down' rather than 'knocker up?'"

* * *

The average cost of wagon repairs is £7 . 13 .6 per year. (From Mr. Maddock November 19, 1868).—*An extract from "The Fact Book," which has been kept by the Divisional Engineer, Plymouth, G.W.R., and his predecessors for nearly a century.*



". . . shan't be sorry when I retire . . ."

[*Reproduced by permission of the proprietors of "Punch"*]

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

NEW SOUTH WALES

Annual Report for 1940-41

In submitting his report to the Minister for Railways, the Commissioner was able to announce that there had been a surplus of £235,951 in the railway accounts after meeting all charges, in the year ended June 30, 1941. Compared with the previous year, the results were :—

	1940	1941	Increase
Earnings ...	£19,954,851	23,215,610	3,260,759
Working expenses ...	£14,646,934	17,161,924	2,514,990
Profit	£5,307,917	6,053,686	745,769

Statutory charges, including interest, exchange, sinking fund and loan management expenses for the year ended June 30, 1941, were £6,617,735, and, after receiving the Government contribution of £800,000, the surplus mentioned above was achieved.

Efficiency in operation, heavy traffic of personnel and stores for the defence authorities, diversion to the railways of traffic due to restrictions on consumption of motor spirit, and to shipping difficulties, absence of serious industrial troubles, and the general buoyancy of business conditions were the chief factors contributing to the sound financial position. The volume of traffic handled during the year reached the highest level ever attained, both passenger and goods.

Record Traffics Carried and Earnings

Passenger journeys totalled 194,145,738, thus exceeding the previous year's figures by 15,079,433, and breaking the record of 189,349,298 passenger journeys established in 1937-38 (the 150th Anniversary Celebrations Year) by 4,796,440. The tonnage of goods and livestock transported rose from 14,619,716 in 1939-40 to 18,031,611, an increase of 3,411,895 tons, and eclipsed the 1926-27 record year by 806,717 tons. These heavy movements of passengers and goods were carried out without disorganisation, and the transport requirements of the defence authorities and the civilian population were most satisfactorily co-ordinated.

Railway earnings during the year amounted to £23,215,610. This was a record and exceeded the previous highest total (in 1939-40) by £3,260,759. Revenues from passenger and goods traffic, refreshment room services, and electricity sales were all at peak levels. Working expenses were £17,161,924, which was £2,514,990 above the previous year's figure, but included £700,000 provision for accruing maintenance. The increase in earnings, when compared with the previous year, was at the rate of 16·34 per cent., and the working expenses rose in much the same ratio, 17·17 per cent. Principal reasons for the increased expenditure were higher material costs, basic wage and marginal increases, and the application of wartime loadings to wages and salaries.

Liberal Concessions

Concessions to members of the armed forces and to blinded and maimed soldiers amounted to £269,467. Direct losses of revenue incurred in the transport at reduced rates of stores and starving livestock totalled £210,148 ; rebates of freight allowed on certain classes of traffic totalled £389,917, thus making an aggregate of £869,532 allowed in concessions. The Commissioner points out also that, in addition to this sum, the State Treasury accepted debits in respect of rebates and concessions amounting to £607,814.

Defence Activities

Considerable work was performed in the department's drawing offices, workshops, and annexes for Commonwealth authorities and for contractors handling defence orders. This included design, supervision, inspection and manufacture, and the production of parts for guns, ammunition, aeroplane components, jigs and tools, tents, and miscellaneous military equipment. Works to provide additional facilities to handle such traffic as ores and coal diverted from sea routes, and to meet defence requirements generally, were undertaken on behalf of the Commonwealth. At the end of the year, in addition to personnel employed by the department on defence work, there were over 200 highly qualified members of the railway staff on loan to Commonwealth departments.

Important Works

With regard to other works related to defence needs, it was decided to accelerate work on the Hawkesbury River bridge, to double the Cootamundra-Junee section and others in the Port Kembla area, to interconnect power supplies in order to safeguard the supply of power to industries engaged on war work, and to provide additional generating machinery.

Two mobile recruiting trains were operated through country districts of the State during the year. Concession fares allowed previously to members of the defence forces were continued, and in some cases extended. In addition, by arrangement with the Commonwealth and State Governments, free travel was granted to defence personnel once a month to enable the men to visit their homes.

CANADA

Record Combined Railway Earnings

For the first nine months of 1941 combined Canadian Pacific-Canadian National Railways net earnings reached a new high record, a figure of $78,300,000, exceeding the previous record for that period, established back in 1928 at $63,000,000, by more than 24 per cent. In comparison with 1940, there was an increase of fully 62 per cent., and the 1939 figure for the period was more than quadrupled. In the matter of coverage of fixed charges there has been a most marked improvement to a point where the aggregate requirements for the two systems, as estimated, have been covered about 1·36 times, as compared with a coverage a year ago of only 0·84 times.

The following table shows the combined net earnings of the two systems for the first nine months of each year over the period 1928-41 inclusive :—

1941	...	$78,316,997	1934	...	$20,812,612
1940	...	48,258,291	1933	...	10,838,825
1939	...	19,357,764	1932	...	13,133,201
1938	...	4,875,540	1931	...	10,722,532
1937	...	23,601,803	1930	...	39,222,142
1936	...	18,032,930	1929	...	62,128,631
1935	...	17,521,319	1928	...	63,016,874

C.N.R. Engines Run 1,000,000 Miles in Ten Years

An average of over 1,000,000 miles has been recorded by each of the " 5700 " class Canadian National Railways locomotives since they were placed in service 10 years ago. Most of this mileage has been made at high speeds, as these engines daily haul the International Limited, one of Canada's fastest trains, between Toronto and Montreal.

UNITED STATES

Success of Coach-sleepers

The Pullman Company's experimental coach-sleepers, introduced about a month ago between New York and Chicago, are proving very popular. They are three-tier-berth low-fare all-coach train vehicles, some of the compartments having three and some six berths arranged transversely. Four of these coaches are at present in service, one on each east- and west-bound train on Pennsylvania and on New York Central metals, respectively. New York—Chicago return coach fares are $27.25, and coach-sleeper fares are $2 higher in each direction. Pullman berths cost from $51.95 to $55.35 for upper and lower berths respectively, so that coach-sleeper accommodation is little more than half the price of Pullman.

New Empire State Express Stock

One of the two 16-car sets recently completed by the E. G. Budd Manufacturing Company for the New York Central System's Empire State Express service has been on exhibition. It will run between New York and Detroit and comes into service just 50 years after the inauguration of the original train.

Each train is more than a quarter of a mile long and has accommodation for 567 passengers in reserved seats in addition to 174 recreation and dining car seats. A complete train includes eight coaches, three parlour cars, two dining cars, a mail-baggage car, a tavern-lounge car and an observation-buffet car. Each passenger coach seats 56 persons and is equipped with individually - adjustable soft rubber cushioned foot rests. The seats have adjustable, reclining backs and cushions of sponge rubber. Each coach also has a lounge for men and women at either end of the car. The parlour cars are each equipped with 35 deeply-cushioned movable lounge chairs, and there is a drawing room with seats for five in the rear section. The dining cars, which seat 44, are divided into three sections. In the centre section are wall seats on both sides, each side seating six persons.

In the observation car the forward end is a card section, with a table seating four on each side. Next to this is the tavern section, with wall seats for 14 and two card-playing groups. A semi-circular bar divides the tavern from the main lounge section. In the latter and the solarium—the semi-circular rear end—are 21 chairs, only eight of which are fixed. The built-in radio in the lounge can be manipulated by the passengers. At the forward end of the train is a tavern-lounge car accommodating 49 passengers. The car has a small but well-equipped buffet.

The new trains run as set-units, being equipped with tight-lock couplers and double action rubber draft gear. The electro-mechanical air-conditioning makes possible a complete change of air in each car in about five minutes. Electric water coolers are used throughout the train.

SPAIN

Death Sentence for Railway Employee

The death sentence has been carried out in the case of a booking clerk, Eduardo Seoane Barral, found by a military tribunal to be guilty of acts of sabotage, leading to a recent accident on the Teijeiro line.

AMERICAN RAILWAY SPEED IN 1941

A review of speed progress in the United States, with steam, diesel, and electric traction. A daily total of 1,629 runs, aggregating in length 80,828 miles, is performed daily at speeds of 60 m.p.h. and over

By CECIL J. ALLEN, M.Inst.T.

FOR yet another year, despite the demands of the national defence programme, the railways of the United States have succeeded in maintaining the unbroken advance in speed that has characterised their timetables throughout the past decade. This is well illustrated in Fig. 1, which shows the rise in the aggregate mileage of runs scheduled daily at speeds of 60, 62, 66, and 70 m.p.h. and over between the years 1932 and 1941 inclusive. From this it will be seen that 1936 was a year of substantial acceleration, but that less was done in 1937; from 1937 onwards, however, the rate of increase, as shown by the straightness of the 60 m.p.h. curve, has been almost exactly uniform year by year. It is significant, however, that in the higher ranges of speed—66 and 70 m.p.h.—the curves have steepened from 1939 onwards. Fig. 2, which illustrates the proportions of the aggregate for which steam, diesel and electric haulage have been responsible respectively, shows that the maximum increase in high speed steam mileage took place between the years 1938 and 1939, since when the steam curve has flattened out considerably; with diesel haulage, on the other hand, whereas the least increase was from 1938 to 1939, the curve since then has steepened in an even greater degree than the slowing-down of the increase with steam. This is due, not only to the numerous additions which have been made to the high speed diesel streamline trains but also to the fact that various companies have been turning over more and more of their regular expresses from steam to diesel haulage. This applies particularly to the Baltimore & Ohio, Chicago, Burlington & Quincy, Union Pacific, Atlantic Coast, and Seaboard Air Line Railroads; and as already announced in THE RAILWAY GAZETTE, yet another stronghold of steam has capitulated to its diesel rival by the change-over of one of the Milwaukee Hiawatha workings in each direction to diesel propulsion.

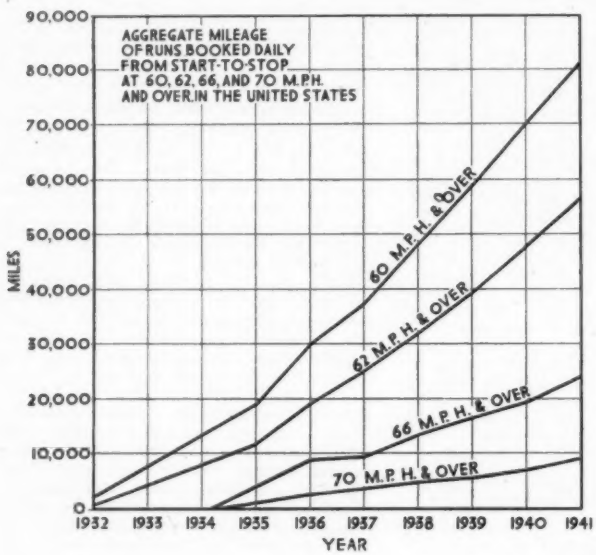


Fig. 1—Speed progress in U.S.A. during the ten-year period 1932-41

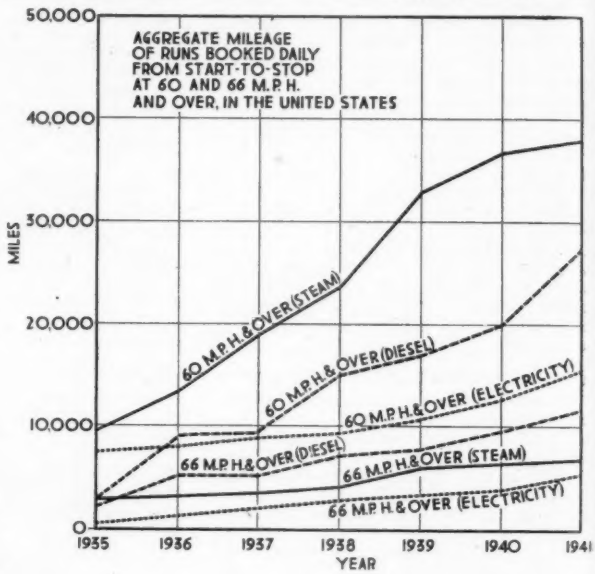


Fig. 2—A comparison of steam, diesel, and electric speed progress in U.S.A., 1935-41

In Table A, which sets out the high speed mileage for which each individual company is responsible, some of the figures are astonishing—in particular the 151 daily runs, with a total length of 8,605 miles, scheduled at 70 m.p.h. and over from start to stop, and the 32 runs, totalling 1,820 miles, at 75 m.p.h. and over. The Burlington and Union Pacific lines, with 1,833 and 1,564 miles respectively at over 70 m.p.h. diesel-hauled, take the lead in this high speed realm, but the Pennsylvania and Milwaukee totals of 1,215 and 1,046 miles with steam are also highly creditable. All things considered, however, the maximum credit for steam enterprise must be given to the New York Central, which occupies a position unique in the world with 18,262 miles daily—2,360 miles more than in 1940—scheduled at 60 m.p.h. and over with steam power. Furthermore, the average weight of the fleet of N.Y.C. expresses involved is probably greater than that of most, if not all, the other companies represented in this table; as an example, the Twentieth Century Limited, which eastbound must be worked over the 133·0 miles from Elkhart to Toledo at 72·5 m.p.h. from start to stop, covering *en route* a length of 30 miles from Mina to Tower D at 78·3 m.p.h., is never less than 14 cars and frequently is made up to 16 vehicles. Steadily making more and more speed use of its electrified lines, the Pennsylvania, with the combination of electricity and steam, once again heads Table A with 18,597 miles daily at 60 m.p.h. and over, roughly 70 per cent. of which is electric mileage. Between them the Pennsylvania and New York Central hold a long lead over all other railways in the U.S.A., and also over the peacetime achievements of all other countries, their individual mile-a-minute mileage in either case being greater than the 1939 aggregate of all the railways in Great Britain, Germany, France, or Italy.

The qualification for appearance in this table is over 500 miles booked daily at 60 m.p.h. and over. On the Burlington line the steam mile-a-minute mileage has fallen from 1,139 to 213 miles, but by reason of the diesel substitution already mentioned, the diesel mileage of this company has risen from 4,163 to 6,637. Other considerable advances in diesel runs at 60 m.p.h. and over have been by the Union

TABLE A—AGGREGATE MILEAGE OF RUNS ON NORTH AMERICAN RAILWAYS SCHEDULED DAILY AT 60 M.P.H. AND OVER FROM START-TO-STOP, SUMMER, 1941

The figures in brackets in each column indicate the number of individual runs making up each aggregate mileage figure.

Railway	60 m.p.h. and over	62 m.p.h. and over	66 m.p.h. and over	70 m.p.h. and over
	miles	miles	miles	miles
Pennsylvania ...	18,597 (375)	14,701 (279)	6,774 (108)	1,215 (15)
New York Central System	18,262 (209)	10,218 (113)	2,082 (20)	399 (3)
Chicago, Burlington & Quincy	6,550 (100)	5,735 (84)	3,733 (55)	1,833 (27)
Atchison, Topeka & Santa Fe	5,273 (110)	3,771 (80)	1,430 (33)	588 (13)
Union Pacific ...	4,982 (106)	3,430 (75)	2,033 (43)	1,564 (33)
Chicago, Rock Island & Pacific	3,743 (90)	2,574 (60)	1,305 (29)	369 (7)
Chicago & North Western	3,415 (74)	2,710 (58)	1,559 (33)	795 (12)
Chicago, Milwaukee, St. Paul & Pacific	3,245 (62)	2,740 (52)	1,763 (33)	1,046 (20)
Baltimore & Ohio*	2,669 (49)	1,415 (26)	30 (1)	—
Chicago, North Shore & Milwaukee ...	1,927 (117)	840 (46)	440 (24)	—
Pennsylvania - Reading-Seashore ...	1,448 (34)	770 (17)	274 (6)	23(1)
Missouri Pacific ...	1,301 (39)	1,072 (32)	169 (4)	—
Seaboard Air Line ...	1,200 (32)	791 (23)	487 (13)	361 (5)
Wabash	1,174 (24)	478 (13)	78 (3)	—
Illinois Central ...	898 (26)	604 (18)	361 (10)	256 (6)
C.B. & Q. and C.R.I. & P. Joint ...	875 (12)	751 (8)	259 (4)	71 (2)
Atlantic Coast Line	862 (10)	677 (8)	37 (1)	—
Southern Pacific ...	756 (10)	614 (8)	190 (2)	—
Chicago & Eastern Illinois	689 (18)	627 (15)	316 (4)	—
Florida East Coast ...	635 (27)	480 (20)	164 (7)	48 (3)
Erie	625 (11)	368 (6)	80 (1)	—
Chicago, South Shore & South Bend ...	520 (50)	480 (46)	27 (3)	27 (3)
Other railways ...	†1,505 (44)	‡918 (28)	130 (5)	10 (1)
Grand totals ...	†81,151 (1,629)	‡56,764 (1,115)	23,721 (442)	8,605 (151)
Total—				
Steam traction...	†38,026 (583)	‡23,141 (351)	7,114 (103)	2,355 (32)
Diesel ,, ...	27,586 (574)	21,974 (446)	11,454 (228)	5,831 (107)
Electric ,, ...	15,539 (472)	11,649 (318)	5,153 (111)	419 (12)

* Includes Alton R.R. mileage. † Includes 3 Canadian Pacific runs (178 miles) and 4 Canadian National runs (145 miles). ‡ Includes 2 Canadian Pacific runs (113 miles) and 2 Canadian National runs (74 miles).

Pacific (2,595 to 4,039 miles), the Rock Island (2,960 to 3,743 miles), and the Santa Fe (3,189 to 3,775 miles). With steam the best increases, apart from the New York Central, have been those of the Pennsylvania (4,914 to 5,539 miles), the Milwaukee (2,707 to 3,245 miles), and the Santa Fe (1,066 to 1,498 miles). With electricity the most striking development has been on the Chicago, North Shore & Milwaukee, the well-known inter-urban line on the shores of Lake Michigan which has not only survived its recent period of adversity, but with the help of its new streamlined Electroliners has recovered with such effect as in a single year to increase its mile-a-minute mileage from 1,439 to 1,927, and all over a main line only 85 miles long and in such short snippets that the average length of run is no more than 16·5 miles. It may be added that as in previous years a proportion only of the mileage of the intermittent runs has been credited to each of the companies concerned, in order to reduce these figures to a daily basis. Also this year the Alton Railroad mileage is incorporated in that of the Baltimore & Ohio, the former being a subsidiary of the latter, even to the extent of using B. & O. locomotives on Alton trains when required.

In Table B, which shows in detail the fastest individual runs, it has been necessary, for reasons of brevity, to move the diesel qualification up from 74 to 76 m.p.h., the steam from 70 to 71 m.p.h., and the electric from 68 to 69 m.p.h.; and the fact that roughly the same number of runs is tabulated as last year also witnesses to the acceleration that has taken place in the interim. The seven 80 m.p.h. runs, six with diesel power and one with steam, remain unchanged from last year; the 84 m.p.h. run of the Burlington Zephyr includes what is believed to be the only 100 m.p.h. pass-to-pass railway schedule in existence—23·95 miles from Cassville to Crawford in 14 min., at 102·6 m.p.h., which forms part of a 37·7-m.p.h. stretch timed at 98·3 m.p.h. A longer diesel schedule of note is over the Santa Fe main line, for 136·7 miles from Hilton to Pierceville at 83·7 m.p.h.; this forms a part of the 202·4-mile non-stop run of both the Super-Chief and El Capitan from La Junta to Dodge City at 78·3 m.p.h. Included in the 81·0 m.p.h. run of the steam-hauled Hiawatha is 48·4 miles from passing Tunnel City to passing Wisconsin Dells in 32 min., at 90·8 m.p.h.; and both daily Hiawatha westbound workings are booked pass to pass over the 57·6 miles from Tower A 20 to Lake, on the Chicago—Milwaukee route, in 38 min., at 90·9 m.p.h. It will be seen that the Milwaukee, with the Mid-West Hiawatha (Chicago—Omaha) added to the double existing Hiawatha workings between Chicago and the Twin Cities, has during the past summer taken the first 9 places with steam, and 17 out of the first 23 places. A number of the new runs in Table B are due to the fact of additional stops having been inserted in the schedules of existing trains (such as the Mendota stop in the Aurora—Galesburg run of the Denver Zephyr) without increase of overall journey time. As in previous years the writer's acknowledgement is due to Mr. Eric Crickmay, of New York, for the painstaking timetable research on which the foregoing tables have been based.

TABLE B—THE FASTEST SCHEDULED RUNS IN THE UNITED STATES, SUMMER, 1941

Railway	Train	From	To	Distance	Time	Speed
				miles	min.	m.p.h.
Diesel Traction (76 m.p.h. and over)						
Burlington ...	Zephyr ...	East Dubuque	Prairie du Chien	54·6	39	84·0
UnionPacific	City of Denver	Grand Island	Columbus...	62·4	46	81·4
Burlington ...	Zephyr ...	La Crosse	Prairie du Chien	57·7	43	80·5 (3*)
Union Pacific	City of Denver	North Platte	Kearney ...	95·0	71	80·3
Florida East Coast	Streamliner(a)	St. Augustine	Bunnell ...	30·5	23	79·6
Union Pacific	City of Denver	Fort Morgan	La Salle ...	52·5	40	78·8
Santa Fe ...	Two trains (b)	La Junta ...	Dodge City	202·4	155	78·3 (2†)
Union Pacific	" City " Services	North Platte	Grand Island	137·2	106	77·7 (3‡)
,,	City of Denver	Julesburg ...	North Platte	81·2	63	77·3
Burlington ...	Denver Zephyr	Aurora ...	Mendota ...	45·0	35	77·1
,,	,,	Galesburg	Aurora ...	124·6	97	77·1
,,	,,	Mendota ...	Galesburg	79·6	62	77·0
,,	Zephyr ...	Prairie du Chien	La Crosse	57·7	45	76·9
Santa Fe ...	Super-Chief ...	Dodge City	Hutchinson	120·2	94	76·7†
Chicago & N.W.	The 400 ...	Evanston ...	Racine ...	49·8	39	76·6
,,	,, ...	Carroll ...	Boone ...	52·3	41	76·5
Santa Fe ...	El Capitan ...	Dodge City	La Junta ...	202·4	159	76·4†
Burlington ...	Zephyr ...	North La Crosse	Winona Jc.	26·6	21	76·0
Steam Traction (71 m.p.h. and over)						
Milwaukee ...	Hiawatha ...	Sparta ...	Portage ...	78·3	58	81·0
,, ...	,, ...	New Lisbon	Portage ...	43·1	33	78·4
,, ...	Hiawatha (c)	Elgin ...	Davis Jc. ...	43·4	34	76·6
,, ...	Chippewa ...	Sturtevant	Deerfield ...	37·9	30	75·8
,, ...	Hiawatha (c)	Delmar ...	Marion ...	53·9	43	75·2
,, ...	,,	Madrid ...	Tama ...	65·9	53	74·6
,, ...	Hiawatha ...	Portage ...	Watertown	46·9	38	74·1
,, ...	Hiawatha (c)	Manilla ...	Perry ...	61·3	50	73·6
,, ...	Hiawatha ...	Portage ...	Columbus...	28·2	23	73·6
Pennsylvania	Detroit Arrow	Englewood	Fort Wayne	140·9	115	73·5
Milwaukee ...	Hiawatha ...	New Lisbon	La Crosse	59·8	49	73·2 (2*)
Pennsylvania	Two trains (d)	Fort Wayne	Englewood	140·9	116	72·9 (2*)
New " York Central	Juniata ...	Plymouth ...	Fort Wayne	64·1	53	72·6
	20th Century	Elkhart ...	Toledo ...	133·0	110	72·5
Pennsylvania	Red Bird ...	Englewood	Fort Wayne	140·9	117	72·3
Milwaukee ...	Hiawatha (c)	Davis Junc.	Elgin ...	43·4	36	72·3
,, ...	Hiawatha ...	Wisconsin Dells	Mauston ...	19·2	16	72·0
,, ...	Hiawatha (c)	Tama ...	Madrid ...	65·9	55	71·9
,, ...	,,	Marion ...	Delmar ...	53·9	45	71·9
,, ...	Hiawatha ...	Chicago ...	Milwaukee	85·0	71	71·8
,, ...	,, ...	Milwaukee	Portage ...	92·9	78	71·5
Pennsylvania	Liberty Ltd.	Plymouth ...	Fort Wayne	64·1	54	71·2
Electric Traction (69 m.p.h. and over)						
C.S.S. & S.B.	Train No. 39	Davis ...	Lake Park	14·3	12	71·5
Pennsylvania	Congressional	N. Philadelphia	Newark (N.J.)	76·0	64	71·3
,,	Train No. 403	Newark (Del.)	Baltimore	56·4	48	70·5
,,	3 trains (e) ...	Newark (N.J.)	N. Philadelphia	76·0	65	70·2 (3*)
	5 trains (f) ...	Baltimore	Wilmington	68·4	59	69·6 (5*)
C.N.S. & M.	11 trains ...	Lake Bluff	Niles Centre	18·5	16	69·4 (11*)
,,	1 train ...	Kenosha ...	Waukegan	15·0	13	69·2
Pennsylvania	Broadway Ltd.	N. Philadelphia	Newark (N.J.)	76·0	66	69·1
,,	Sea Plane ...	Trenton ...	Elizabeth ...	42·6	37	69·1

Figures in brackets in last column indicate number of runs so scheduled, if more than one.

(a) Chicago-Miami. (b) Super-Chief and El Capitan. (c) Mid-West Hiawatha. (d) Chicago Arrow westbound and Red Bird eastbound. (e) Broadway Limited, Congressional and St. Louisian. (f) Congressional, both ways ; East Wind, both ways ; and Constitution.

* In both directions of running. † Each run twice weekly. ‡ Two runs ten times monthly and one run five times monthly.

BLAST PIPE AND CHIMNEY EXPERIMENTS ON THE SOUTHERN RAILWAY

Schemes for increasing the evaporative capacity of the boilers and reducing back pressure in the cylinders of the "Lord Nelson" class locomotives have been subjected to a series of extended trials

THE four-cylinder 4-6-0 type "Lord Nelson" class locomotives of the Southern Railway are sixteen in number; the first was built in 1926 and the remainder in 1928-29, to the design of Mr. R. E. L. Maunsell, then Chief Mechanical Engineer. The engines were employed on heavy Continental boat trains and West of England services. In more recent years demands arose for greater loads and higher speeds, and in order to increase the evaporative capacity of the boiler by means of a higher rate of combustion on the grate and at the same time raise the efficiency of the engine by reducing back pressure in the cylinders, experiments were put in hand by Mr. O. V. Bulleid, the present Chief Mechanical Engineer, early in 1938. The original blast pipe and chimney arrangement is shown in Fig. 1; the blast pipe orifice was 5½ in. dia. and 23·7 sq. in. in area, and the tapered chimney liner had a choke of 15 in. This arrangement is referred to hereafter as the old standard.

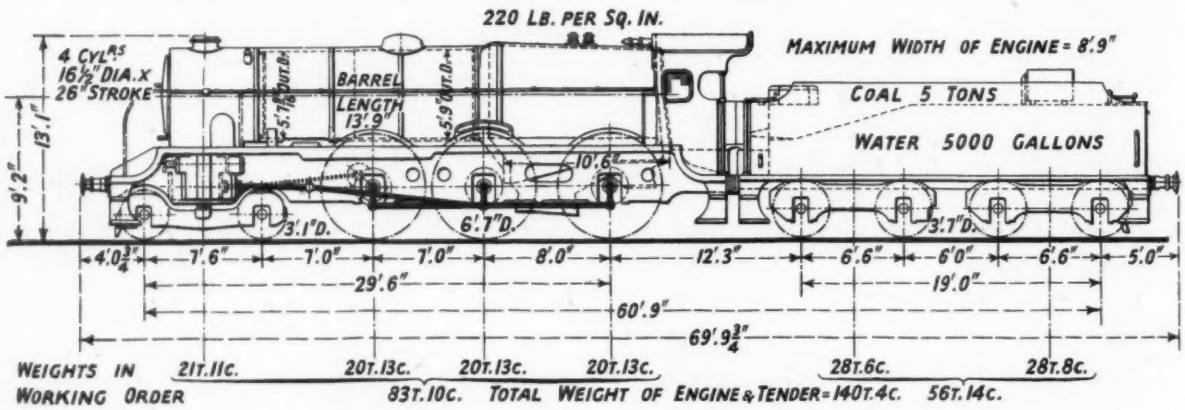
The series of experiments which led up to the arrangement now adopted began with engine No. 865. A double chimney was fitted and separate blast pipes provided for the inside and outside cylinders Fig 2. This engine was selected because, unlike the others of the class, it has the inside and outside cranks on each side set at 180 deg. to one another, so that the exhausts of the inside and outside cylinders occur simultaneously. Each blast pipe orifice had a diameter of 5 in. in which were fitted four nibs, giving a total nett area of 32·2 sq. in., as compared with the 23·7 sq. in. of the old standard. The arrangement was based on the Kylchap system without the intermediate liners.

Shortly afterwards No. 862 was fitted with a similar arrangement, but in this case there were two plain 4½ in. dia. orifices, giving an area of 31·8 sq. in. This engine has its cranks set at 135 deg. to one another, so that the exhausts of the two blast pipes do not synchronise, but occur alternately. As from L.N.E.R. experiments it was known that the vacuum in a smokebox was not constant but varied from atmospheric pressure to the maximum vacuum between beats, it was not anticipated that while the exhaust was discharged into one chimney, air would be drawn into the smokebox through the other one, and no trace of any such effect was observable at running speeds. The arrangement on No. 862 gave rather better results in the way of steaming than the old standard, but it was not so marked in the case of No. 865.

The next stage was to fit on No. 863 a chimney having a 23-in. choke, and the blast pipe cap was removed altogether, leaving a plain blast pipe orifice of 8-in. dia. with an area of 50·2 sq. in. While steaming was poor, this trial constituted the first step of the series as set out in the table on page 53, where it is referred to as experiment No. 1. In experiment. No. 2, two ¼-in. dia. rods were placed at right angles to one another across the top of the blast pipe, and in experiment No. 3 an inverted cone was tried inside the orifice, reducing it to an annulus of 36·5 sq. in. in area; there was no improvement worth mentioning in either case.

In experiment No. 4 a multiple-jet blast pipe cap was tried, having seven jets 2½-in. dia., one in the centre and six set at an angle of 1 in 12 outwards, spaced on a circle of 6½-in. dia., having a total area of 34·3 sq. in. This proved a step in the right direction, and in experiment No. 5 the centre jet was blocked, leaving six jets having an area of 29·4 sq. in. and bringing about further improvement. The steaming was, however, still rather inferior to the old standard. The next step, experiment No. 6, was to substitute a similar cap having five jets of 2½-in. dia. giving an area of 24·5 sq. in., and not only was this entirely satisfactory, but it produced better steaming than the old standard. The arrangement is shown in Fig. 3 and a drawing of the cap in Fig. 4. This success led to engines Nos. 855, 856, 861, and 864 being equipped towards the end of 1938 with the 23-in. chimney, and experiments with the blast pipe top were further continued.

In experiment No. 7 a new cap having four jets 3⅜-in. dia. was tried, but it proved to give inferior results to the old standard. For experiment No. 8 the jets were bushed up to 3¼-in. dia., and in experiment No. 9 crossed ¼-in. dia. rods were placed across the tops of the jets, but in neither case was the result much better. A cap with five jets 3-in. dia. giving an area of 35·3 sq. in. was substituted in experiment No. 10 with no success, but another one having four jets of 2⅞-in. dia. with an area of 26·0 sq. in. produced in experiment No. 11 superior steaming to the old arrangement, but not quite as good as found in experiment No. 6, which remained the high water mark. Experiment No. 5 was then



General dimensions and weight distribution diagram of Southern Railway "Lord Nelson" class express locomotive

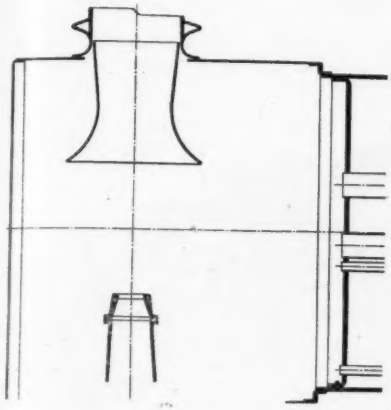


Fig. 1

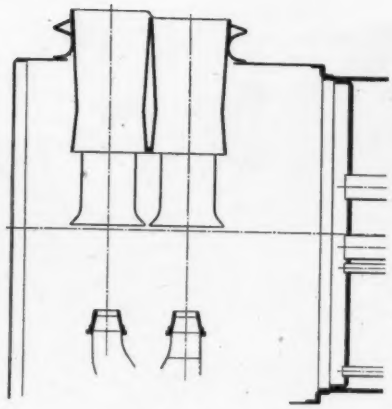


Fig. 2

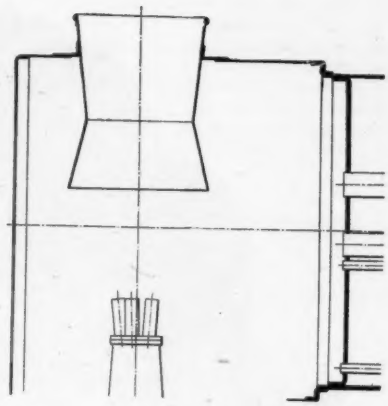


Fig. 3

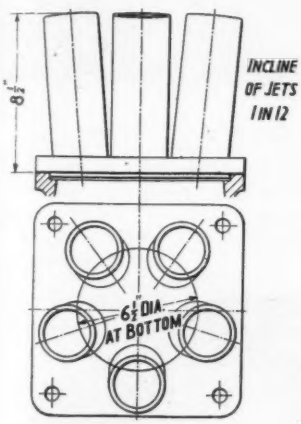


Fig. 4

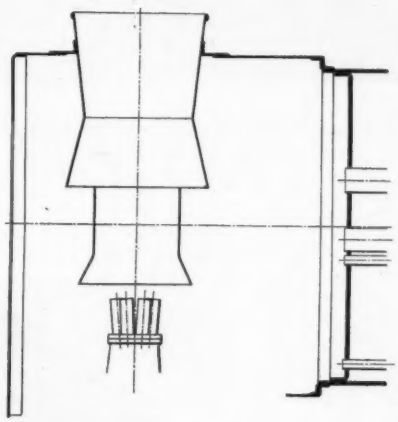


Fig. 5

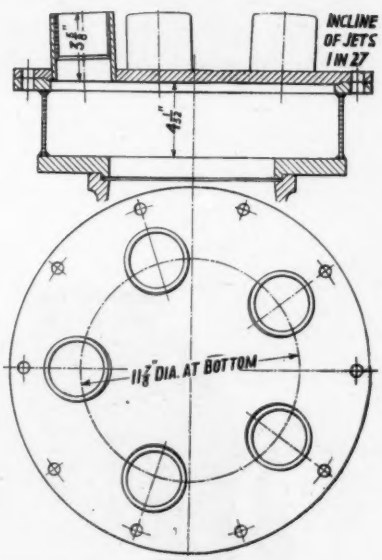


Fig. 6

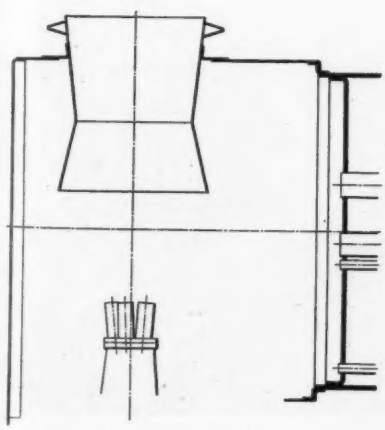


Fig. 7

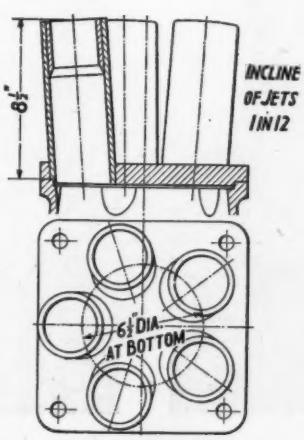
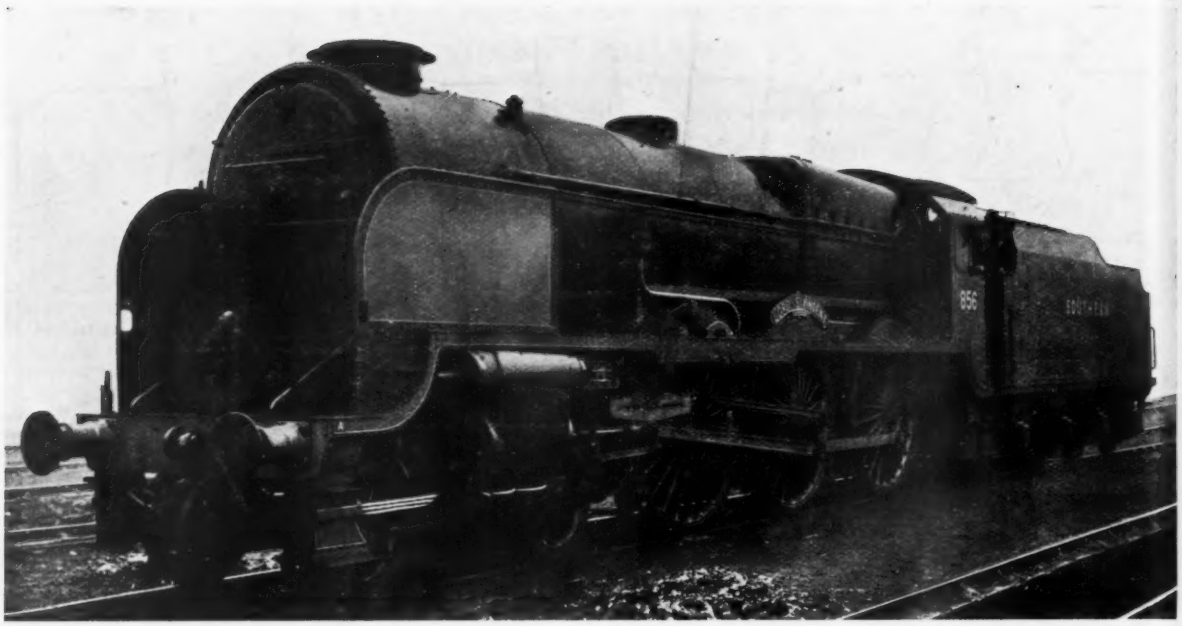


Fig. 8

The Fig. Nos. below the diagrams correspond to the progressive experimental stages described in the text on pages 50 and 53 and the table on page 53

Diagrams showing alternative schemes adopted in connection with blast pipe and chimney experiments on the Southern Railway "Lord Nelson" class locomotives



General view of "Lord Nelson" class locomotive fitted with 25 in. dia. chimney and multiple jet blast pipe

Front end of engine seen above, No. 856, "Lord St. Vincent"

Interior of smokebox showing 2¾ in. dia. jets and enlarged chimney liner

BLAST PIPE AND CHIMNEY EXPERIMENTS ON THE SOUTHERN RAILWAY

repeated in experiment No. 12 on engine No. 863, but with a petticoat pipe 18-in. dia. interposed between the blast pipe and chimney, as in Fig. 5, and while improving matters, it did not result in such good steaming as with the old standard.

By this time engine No. 856 had been fitted with the 23-in. chimney used in experiment No. 6, and experiment No. 13 was carried out on this engine with a new blast pipe cap, Fig. 6, having the five jets spaced on a circle of $11\frac{7}{8}$ in. This necessitated a distance piece in the form of a cylindrical chamber, in order to utilise the existing blast pipe. The jets were inclined at an angle of 1 in 27, but there was a tendency for the exhaust to strike the flare at the base of the chimney and escape outside. The design left pockets or dead spaces in the chamber, and with a view to eliminating them the cap was provided with sloping sides, producing a frustrum of a cone, while an inverted cone was attached to the centre of the top plate, on its underside and inside the circle of jets. Thus a better lead was given to the steam from the blast pipe top to the jets, which were five in number and 3-in. dia., but results did not come up to expectations and a reduction to $2\frac{3}{4}$-in. dia. was made for experiment No. 14, without marked improvement, the steaming being definitely inferior to the old standard.

On the other hand, with engine No. 864 a five-jet cap, $2\frac{3}{4}$-in. dia. was used in conjunction with a 25-in. instead of a 23-in. chimney, and gave good results in experiment No. 15. The cap was changed in experiment No. 16 for the original design (Fig. 5), and results then became comparable with that in experiment No. 6, with the 23-in. chimney. It was found possible in experiment No. 17 to open out the jets to $2\frac{5}{8}$ in. so that the larger chimney permitted of a 10 per cent. increase in area at the nozzle, thus reducing back pressure.

This arrangement was adopted as the new standard early in 1939, and the engines retaining the old standard were first dealt with. The double chimney engines, Nos. 862 and 865, were next converted, and finally those with the 23-in. chimney had it replaced by a 25-in. one; the alteration was practically completed at the outbreak of war in September, 1939. The new standard and latest multiple-jet cap are illustrated in Figs. 7 and 8.

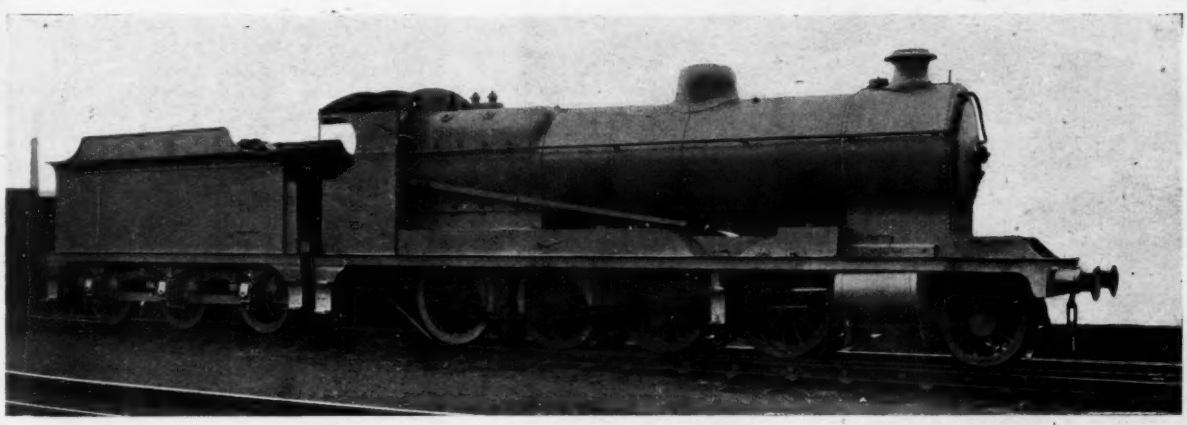
Concurrently with the later stages of the smokebox experiments further improvements had been made in the cylinders, piston valves and exhaust pipe layout. This resulted in lower back pressure, more expansive working and reduced pressure for the blast, and steaming fell off with the improvements. A reduction was therefore made in the jets to $2\frac{5}{16}$ in. diameter. At a later date, deterioration of the coal supplies also affected the steaming, and another reduction to $2\frac{1}{8}$ in. was made as a wartime measure.

Although experiments Nos. 1 to 17 as in the table below were the series concerned in the evolution of the old standard to the new, a number of subsidiary experiments were carried out to start investigation in other directions, but none of them led to anything which promised a new opening to better conditions. For instance, a multiple-jet cap was tried with the original 15-in. chimney liner, and various forms of single caps with nibs were introduced. Multiple-jet caps were also tried with the double-chimney arrangement.

TABLE OF EXPERIMENTS

Exp. No.	Engine No.	Particulars of Trial	General Result	Result compared with Old Standard
1	863	No cap, 8-in. orifice, 23-in. chimney	Very unsatisfactory	Definitely inferior
2	863	As above, two ½-in. dia. rods at right angles across cap	Only slightly better than No. 1	,, ,,
3	863	As in No. 1, but inverted cone 4-in. dia. placed in top of blast pipe	Unsatisfactory ...	,, ,,
4	863	Multiple-jet cap with 7 jets...	Slight improvement	Inferior
5	863	As No. 4 but with centre jet blocked to give 6 jets	Further improvement	,,
6	863	New cap with 5 jets, 2½-in. dia.	Entirely satisfactory	Superior
7	863	New cap with 4 jets, 3⅜-in. dia.	Unsatisfactory ...	Inferior
8	863	Cap in No. 7 bushed to 3½-in. dia.	,, ...	—
9	863	As in No. 8 but with ½-in. crossed rods across tops	Slight improvement over No. 8	,,
10	863	New cap with 5 jets, 3-in.dia.	,, ,,	,,
11	863	New cap with 4 jets, 2⅞-in.dia.	Good, but inferior to No. 6	Improvement
12	863	Conditions as in No. 5, but with addition of petticoat pipe	Improvement over No. 5	Slightly inferior
13	856	New cap with 5 jets, 3-in. dia. on large circle	Unsatisfactory ...	Definitely inferior
14	856	As No. 13, jets bushed to 2⅜-in. dia.	,, ...	Inferior
15	864	As No. 14, but with 25-in. chimney	Satisfactory ...	Superior
16	864	As No. 6, but with 25-in. chimney	Very good ...	,,
17	864	As No. 16, jets opened out to 2⅝-in. dia.	Entirely satisfactory	,,

We are indebted to Mr. Bulleid for the foregoing particulars and drawings. The photographs forming the originals of the illustrations on page 52 were taken by THE RAILWAY GAZETTE photographer at the Nine Elms locomotive depot of the Southern Railway.

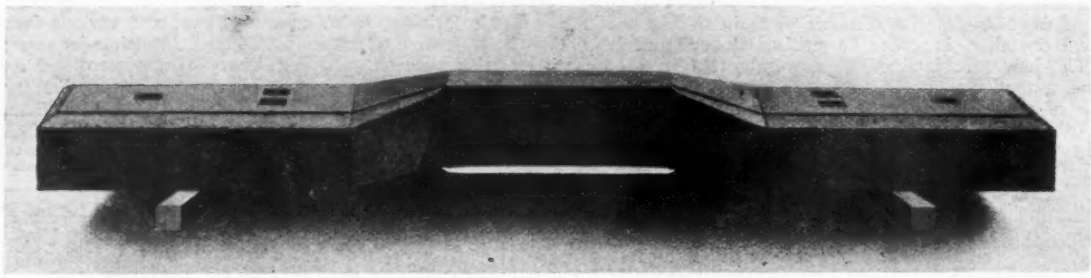


One of 92 L.N.E.R. 2-8-0 freight locomotives which have been reconditioned and already sent overseas to help in maintaining lines of communication to Russia. They have been equipped with steam brakes

The original locomotives of this design were built by the old Great Central Railway at Gorton works in 1911. In 1912 contracts were placed with various British locomotive builders to produce the type as the standard freight locomotive for traffic in the South Yorkshire coalfields. During the war of 1914-1919 many of these engines rendered excellent service with the British Forces overseas, modified with Westinghouse pumps and piping and steel fireboxes. After the war individual units found their way to many parts of the world, but most were returned to the old G.C.R. and so passed to the L.N.E.R. (*see letter to Editor, page* 45.)

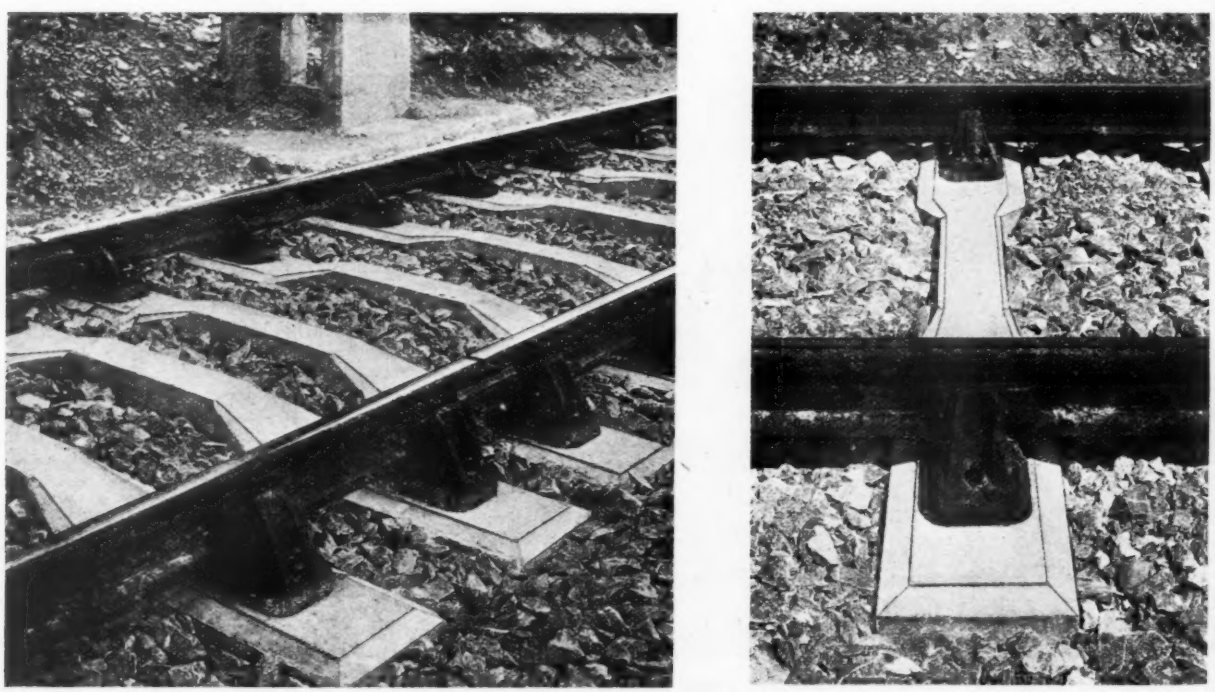
FRENCH CONCRETE SLEEPERS

A type of reinforced concrete sleeper on the Midi Railway



Orion type of reinforced concrete sleeper. Note raised middle portion designed to obviate centre-binding

THE question of substitutes for timber for railway sleepers in wartime has become acute in countries such as Great Britain, which in normal times import most of their requirements. At the present time experiments are being conducted with the use of reinforced concrete, both as block and transverse sleepers. In our issue of November 14 (page 504) we described the Great Western Railway reinforced concrete pot sleeper which is now being produced in considerable quantities for use in lines carrying traffic at a maximum of 25 m.p.h., and in our issue of December 19 & 26, a type now extensively used in standing sidings on the L.M.S.R. was shown. Similar experiments were conducted by several British railways during the last war, but the matter was not pursued subsequently as the position in regard to the supply of recovered wooden sleepers suitable for siding purposes did not reach so acute a position as that which prevails today. One of the few examples of non-emergency use of concrete sleepers is provided by the old Midi Railway, which now forms part of the South Western Region of the French National Railways, and a type of reinforced concrete sleeper used there is illustrated in the accompanying pictures. The Midi Railway has been probably the largest user of reinforced concrete sleepers in France, and besides this type, has extensive mileages of concrete block sleepers. Among the advantages claimed for this particular type, known as the Orion, are its heavy weight, which provides against lateral movement, and makes for the general stability of the track, and its peculiar shape, whereby the weight is transmitted to the ballast only by the sections under the rails, the middle part, which is slightly raised, being thus free from risk of centre-binding.



Orion type of reinforced concrete sleeper as used on the old Midi section of the French National Railways. Note the use of bull-head rail held in chairs by means of steel keys, and also the two-bolt chevron fishplate

ELECTRIC TRACTION SECTION

Electrification in New Zealand

A summary of the work accomplished over a period of 17 years

Christchurch–Lyttelton electric suburban train at Christchurch. These locomotives are capable of speeds in excess of 50 m.p.h.

ELECTRIFICATION in New Zealand began not with the conversion of a steam line but with the construction of an entirely new route for which no other form of traction than electric was ever considered seriously. This was the important trunk line connecting the South Island towns of Christchurch and Greymouth, which had to cross the Southern Alps, the summit of which it penetrated by means of the 5½-mile Arthur's Pass (sometimes known as the Otira) tunnel, graded at 1 in 33. Boring of the tunnel was begun in 1908, but the complete electrified section of 8·4 route miles was not opened until 1924. The English Electric Co. Ltd. supplied the equipment, including a 2,400-kW steam generating station at Otira, the 1,500-volt d.c. overhead equipment, five 720 h.p. 50-ton Bo-Bo electric locomotives for passenger and freight service, and one 200 h.p. battery locomotive. Increased traffic over the line in recent years has led to sanction for high tension energy to be taken from the national hydro-electric system originating at Lake Coleridge, and a new substation with two 1,800 kW rectifiers has been built at Otira. The original steam plant is being retained as a standby. New 2-Do-1 locomotives of the type built first for the North Island electrified line are now being used.

At the east end of the Greymouth—Christchurch trans-island trunk route is the Christchurch—Lyttelton suburban line. Conversion of this 7-mile section was begun about 14 years ago and opened on the standard 1,500-volt d.c. system on February 14, 1929. From the beginning, current has been obtained from the South Island grid which develops its power from Lake Coleridge, and there is one rotary converter substation of 2,700 kW capacity half-way along the line. Six 1,200 h.p. 50-ton double bogie locomotives were built by English Electric, who carried out the complete electrification, and they work both passenger and freight trains. An accompanying illustration shows one of them at the head of a suburban train.

Later electrification has been in the North Island, and comprises the new Wellington—Paekakariki cut-off line of the northern trunk-route and the Wellington—Johnsonville section of the old route, which is now used only for suburban traffic. Locomotives of the 2-Do-1 type were built for the first named, but multiple-unit trains were introduced on the Johnsonville line. The first locomotive was built throughout in England, but for the next nine locomotives the electrical equipment was supplied by the English Electric Co. Ltd., and the mechanical portions were built at the Hutt Valley shops of the N.Z.G.R. Two of the nine locomotives have gone to the Arthur's Pass line in South Island. All have a one-hour rating of 1,240 h.p., a haulage capacity of 250 tons at 55 m.p.h. or 500 tons at 45 m.p.h., and a weight of 88 tons, whereas the motor-coaches have a one-hour output of 660 h.p. The multiple-unit train set is a two-coach formation comprising one motor-coach and one trailer, weighing 67 tons and seating 141 passengers. Current for the 1,500-volt d.c. overhead system is taken from the North Island grid, for which power is generated in hydro-electric stations.

The electrified mileage in New Zealand is now as follows:—

Line	Mileage: Route	Mileage: Track	System	Date opened
South Island—				
Arthur's Pass	8·4	13·4	1,500 d.c.	1924
Christchurch-Lyttelton ...	6·4	18·6	1,500 d.c.	1929
North Island—				
Wellington-Johnsonville ...	33·0	60·0	1,500 d.c.	1938
Wellington-Paekakariki ...				1939–40

The various routes and their electrical equipment have been described in the issues of THE RAILWAY GAZETTE listed below:—

Arthur's Pass	December 11, 1925 (brief)
Christchurch—Lyttelton ..	April 26, 1929
Wellington Lines	November 11, 1938*
	January 7, 1938 (trains)*
	February 4, 1938 (locos)*
	March 3, 1939 (control)*

* In Electric Traction Supplement

Conductor Rail and Contact Wire

Arrangements on British electric railways

In the electrification schemes put in hand by British railways in earlier years various methods of current collection and return were adopted. Some of these were retained and others were altered at a later date to conform to a standard; the accompanying tabular statements show the systems originally used by the constituent lines of the main-line groups and the London Passenger Transport Board, and by other lines; subsequent conversions and alterations; and post-grouping systems. The voltages given are nominal.

I—LONDON MIDLAND & SCOTTISH RAILWAY

Electrified Sections and Voltage	*System of Current Collection*
L.N.W.R. Euston and Broad Street to Watford and Rickmansworth; Broad Street to Willesden Junction (High Level), Richmond, Kew Bridge and Earls Court (600 V. d.c.).	Third and fourth rails, positive outside the track and negative in centre.
L.M.S.R. Wirral lines (650 V. d.c.) ...	Positive rail outside track, with running rail return; for operating on Mersey line a negative shoe makes contact with latter railway's fourth rail.
L. & Y.R. Liverpool - Southport and branches (600 V. d.c.).	Positive third rail outside the track, with return through running rails; a fourth uninsulated rail was laid in centre of track, bonded to running rails at intervals, to reinforce the return. The running rails were not bonded where this fourth rail was laid, but at places where it was inconvenient to provide it they were bonded to one another in the usual way.
L. & Y.R. Manchester-Bury (1,200 V. d.c.)	Third rail with track return augmented by fourth; shoes make contact on near side of conductor rail, allowing for greater protection of rail, necessary in view of high voltage used.
L. & Y.R. Bury-Holcombe Brook (3,500 V. d.c. Changed to 1,200 V. d.c. in 1915.	Overhead. Changed to Manchester-Bury system in 1915.
M.R. Lancaster-Heysham (6,600 V. single phase, 25 cycles).	Overhead.

II—LONDON & NORTH EASTERN RAILWAY

N.E.R. North Tyneside lines (600 V. d.c.)	Third rail outside track, except for Quayside goods branch, which is worked on overhead principle. In May, 1936, conductor rails were moved 3½ in. nearer running rails to conform to Ministry of Transport standard.
L.N.E.R. South Tyneside line (600 V. d.c.)	Third rail outside track.
N.E.R. Shildon-Newport (1,500 V. d.c.)...	Overhead. (Electric traction replaced by steam on January 7, 1935.)

III—SOUTHERN RAILWAY

L.B. & S.C.R. Victoria-London Bridge; Battersea Park-Crystal Palace-Croydon-Coulsdon-Sutton; London Bridge-Crystal Palace (6,600 V. single phase, 25 cycles).	Overhead; converted to standard Southern Railway system 1928-29.
L.S.W.R. and later S.R. work (600 V. d.c.)	Third rail outside track; at places (e.g., on Addiscombe line) a reinforcing rail, bonded to the running rails, has been laid in the 4-ft. way slightly to one side.
Waterloo & City Railway (tube) (500 V. d.c.).	Third rail in centre of track; altered to side of track position in October, 1940, to conform to Southern Railway standard, and voltage raised to 600.

IV—LONDON PASSENGER TRANSPORT BOARD*

Baker Street & Waterloo, Charing Cross, Euston & Hampstead; Great Northern, Piccadilly & Brompton; Metropolitan; Metropolitan District; L.M.S.R. Bow-Upminster line (worked by L.P.T.B.).	Third and fourth rails, positive outside the track, negative in the centre, except on the Baker Street & Waterloo, which, until the opening of the Watford extension, had the polarity of the conductor rails reversed. This system is London Underground standard.
City & South London	Third rail laid in 4-ft. way, 1 ft. from one of running rails; altered to London Underground standard on reconstruction of line, 1922-24.
Central London	Third rail in centre of track; altered to London Underground standard in April, 1940.
Great Northern & City	Third and fourth rails, one on each side of track; altered to London Underground standard in May, 1939.

* Current now used on all sections and to be used on all future extensions: 600 V. d.c. (nominal.)

V—OTHER RAILWAYS

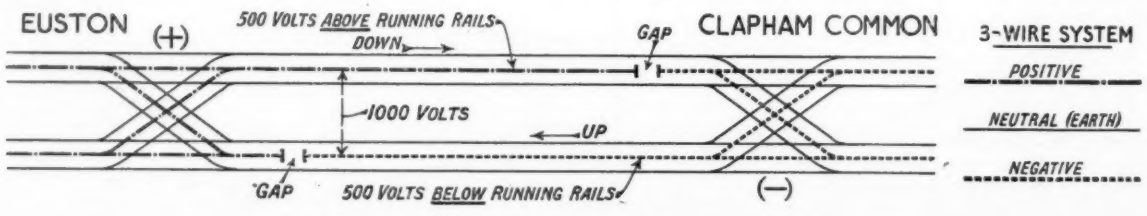
Mersey (650 V. d.c.)	Third and fourth rails, positive outside track and negative in centre. Positive conductor rail was moved 6 in. nearer running rail and 2 in. lower than its original position in August and September, 1936, to conform to Ministry of Transport standard.
Liverpool Overhead (600 V. d.c.) ...	Third rail in centre of track; altered in 1905, for the through running of L. & Y.R. electric trains, to side of track, the old centre rail then being used to reinforce the return; in 1921, on the adoption of single-rail track-circuit signalling, the centre rail was discarded, and in 1927, when the company's own generating station was closed and power taken from Liverpool Corporation, the negative feeders formerly used with boosters were put in parallel with the continuous return rails.
Manchester, South Junction & Altrincham (L.N.E.R. and L.M.S.R. Joint) (1,500 V. d.c.).	Overhead.
Glasgow Subway (570 V. d.c. when converted).	Originally operated by cable. Converted to electric traction with third rail outside track, in January, 1935. Owing to small diameter of tunnels, third rail is at a relatively considerable distance from the running rail in both vertical and horizontal directions, and steel sleepers have had to be introduced beneath the conductor rail insulators to give extra support.
Swansea and Mumbles (650 V. d.c. when converted)	Formerly steam worked. Electric traction introduced in 1929. Overhead.

VI—ELECTRIFICATION SCHEMES PENDING

L.N.E.R. (1) Wath-on-Dearne and Sheffield to Manchester; (2) Liverpool Street and Fenchurch Street to Shenfield (1,500 V. d.c.).	Overhead.

As a rule, live rails on which shoes ran had their surfaces above that of the running rails. On the City & South London, however, the third rail was below, and on the Waterloo & City it was at the same level; this was done to get as much clearance as possible below underframes, which came down rather low, especially on the C. & S.L. locomotives. Where turnouts existed, wood inclines were inserted and the live rail broken off a distance back, so that the shoes were carried up and over where running rails crossed. In the first scissors crossover at Stockwell, movable conducting bridges, worked from the signal box and interlocked, provided a continuous path.

The City & South London was first operated on the straight d.c. system, with the third rail fed direct from Stockwell power house. With the 1900 extensions, a new power station was built and the line converted to the 3-wire method of working, whereby the third rail on one track, say, the down, was positive and that on the other track negative, with 1,000 volts between them, the rails forming the neutral intermediate point and being to earth. Current passed through the trains in one direction on the down line (third rail to running rails) and in the reverse direction on the up line (running rails to third rail). To avoid complications at



Three-wire d.c. traction system used on C. & S.L.R.

the scissors crossings at the two terminals, Euston and Clapham Common, they were arranged on opposite sides of the system.

Before a train reached the home signals at a terminal, it went over a gap longer than the locomotive, which broke the supply to it, as it passed from one polarity to the other, and caused the lights to go out for a brief interval. The accompanying diagram explains the principles of this arrangement. The transmission system to the substations was on the five-wire principle, with 2,000 volts across the outers, and incorporated a clever arrangement of reducers and balancers; the substations also included large accumulator batteries, especially useful in certain emergencies; the whole installation was unique in tube railway engineering.

The Gotthard Locomotives

A comparison of the 15-kV. single phase types which have been built for service between Lucerne and Chiasso, and some particulars of the newest design

THE appearance of the first new Gotthard locomotives on the Swiss Federal Railways, as described and illustrated in the Electric Traction Section of THE RAILWAY GAZETTE for June 27 and August 22, makes topical a brief review of the technical features and progress of the locomotives built for this important route during the last ten years.

In 1932 two very large and powerful locomotives of different design were introduced to work the heaviest and fastest freight and passenger trains. Brown Boveri was responsible for the electrical equipment of one and Oerlikon for the other. Both were double-unit locomotives classified Ae 8/14 in the Swiss Federal list; that is, eight out of 14 axles were driven. The wheel arrangement was 2 (1-Bo-1-Bo-1), and the numbers respectively 11801 (Brown Boveri) and 11851 (Oerlikon); both had a one-hour h.p. of approximately 8,800.

A yet more powerful locomotive embodying all the mechanical and electrical improvements of seven years was completed in 1939, Oerlikon being responsible for the electrical equipment. A very complete description of this 12,000 h.p. locomotive of the same 2 (1-Bo-1-Bo-1) wheel arrangement was given in the Electric Traction Supplement for July 21, 1939. Much of the great increase in power compared with the locomotives of 1932 was gained by the introduction of new rating methods.

Finally, in March, 1939, just before the delivery of the 12,000 h.p. locomotive No. 11852, four more locomotives were ordered, and supplemented by a further contract for two placed in April, 1941. This final type is equivalent to one-half of the 1939 locomotive, and has a one-hour rating of 5,700 h.p., but by careful attention to detail construction it has been found possible to lighten the locomotive and do away with the centre carrying axle, making the wheel arrangement 1-Bo-Bo-1.

The accompanying table gives leading particulars as to output and weight of the machines of 1932, 1939 and 1941, one half of the bigger locomotives being taken as a standard of comparison with the new locomotives Nos. 10801-06 of series Ae 4/6. The traction motors for four of the new locomotives are being supplied by Oerlikon, and those for the other two by Sécheron; the transformers and control apparatus are being built by Brown Boveri, and as with all previous Gotthard locomotives the mechanical portions are being fabricated by the Swiss Locomotive Works, but assembly of the complete locomotives is being done at the Berne works of the Swiss Federal Railways.

—	No. 11851 (half loco.)	No. 11852 (half loco.)	No. 10801
Years of construction	1932	1939	1941
Wheel arrangement	1-Bo-1-Bo-1	1-Bo-1-Bo-1	1-Bo-Bo-1
One-hour h.p.	4,400	6,000	5,700
Wt. of mech. portion, *tonnes*	62·9	59·75	55·9
Wt. of elect. equip., *tonnes* ..	58·6	56·10	48·8
Wt. of personnel, sand, *tonnes*	0·5	0·65	1·3
Total wt., *tonnes*	122·0	116·5	106·0

Compared with one half of the 1939 locomotive, the saving in weight of 9 per cent. for a drop in one-hour output of 5 per cent. of the new Ae 4/6 series has been obtained in the mechanical portion by reducing the main frame plates from 30 mm. to 28 mm., rearrangement of the frame stays, more extensive use of light metals for the body, roof, floor and other details, lighter driving gears from motors to axles, laminated springs of special section, and the use of partial welding in the frame construction of the Java trucks at each end. The weight saving here and in the electrical portion made it possible to eliminate the centre carrying wheels and axle. Suspension of the trucks is quite separate from that of the driving wheels, which are grouped in two equalised systems.

The double-unit Gotthard locomotive of 1939 was arranged to run at a top speed of 110 km.p.h. (68½ m.p.h.), but the new 5,700 h.p. locomotives have a designed top speed of 125 km.p.h. (77½ m.p.h.); therefore the brake system and rigging have been improved, and a separate brake cylinder added to each truck. The compressor fitted has a capacity of 160 cu. m. an hour compared with 140 cu. m. an hour of the model fitted to the 1939 locomotive. The sloping front of the 1939 locomotive shown at the Swiss National Exhibition of that year has been modified in the new locomotives to the curved end used in the new motor vans and diesel-electric locomotives.

A reduction in weight has also been effected in the electrical equipment. The traction motors (aggregating 5,700 h.p.) weigh about 20 *tonnes* compared with the 23½ *tonnes* (for 6,000 h.p.) of the motors of locomotive No. 11852; regenerative braking equipment accounts for 1·4 *tonnes* compared with 2·2 *tonnes*. These savings have been made possible by increasing the speed of the traction motors and decreasing the mass; improving the cooling of the stator; and tightening the construction of the bearings and their supports. A further 2·0 *tonnes* weight has been saved by substituting a main air circuit breaker for the oil type used previously, by a simpler cable layout, and the use of light alloys for the brackets and supports of various items of electrical equipment. The new breaker has a rupturing capacity of 200,000 kVA.

The four traction motor groups are grouped in parallel, but the two motors in each group are coupled in series and fed at a tension varying from 80 to 950 volts. The increase in voltage given by the 26-notch control is between 30 and 14 volts per notch from 1 to 7; about 20 volts per notch between 7 and 13; between 26 and 34 volts for each notch from 13 to 18; and about 40 volts for each notch above 18. When running with regenerative braking the motor coupling is different; one motor of the first axle group supplies the excitation current for the three remaining groups, the second motor on the first axle group running idle. The control of the main transformer is on the Brown Boveri high-voltage system.

As stated in the June 27 issue of THE RAILWAY GAZETTE the one-hour output is 4,200 kW (5,700 h.p.) at 84 km.p.h. (52 m.p.h.), corresponding to 525 kW (430 volts 1,380 amp.) per motor, and giving a tractive effort at the wheel rims of 17,760 kg. (39,000 lb.) total. On the continuous rating the aggregate output is 3,960 kW (5,320 h.p.) at 86·5 km.p.h. (54 m.p.h.), corresponding to 495 kW (430 volts and 1,300 amp.) per motor, the total tractive effort being 16,400 kg. (36,100 lb.). The electrical equipment is capable of giving a starting tractive effort of 28,000 kg. (61,750 lb.), but rail conditions must limit this to about 24,000 kg. (53,000 lb.), which is equivalent to a factor of adhesion of 3·33; an effort of 20,000 kg. (44,000 lb.) is available up to about 20 km.p.h. (12½ m.p.h.).

Sleet Locomotives for the L.P.T.B.

A design using sprays and brushes is used to keep the conductor rails of the 600-volt d.c. lines free from ice and sleet during winter conditions

TO eliminate the serious delays sometimes caused during winter months by ice and sleet coatings on the positive and negative conductor rails of the surface line system, the London Passenger Transport Board has constructed 18 special sleet locomotives under the direction of Mr. W. S. Graff-Baker, the Chief Mechanical Engineer. Each locomotive was constructed from two old Central London Railway deep-level tube motor-coaches, the passenger saloons of which were cut out, leaving only the equipment compartment and driver's cab. Two of these remainders were then connected by a new centre portion housing the tanks and operating gear for the anti-freeze mixture, which is sprayed on to the positive and negative conductor rail heads.

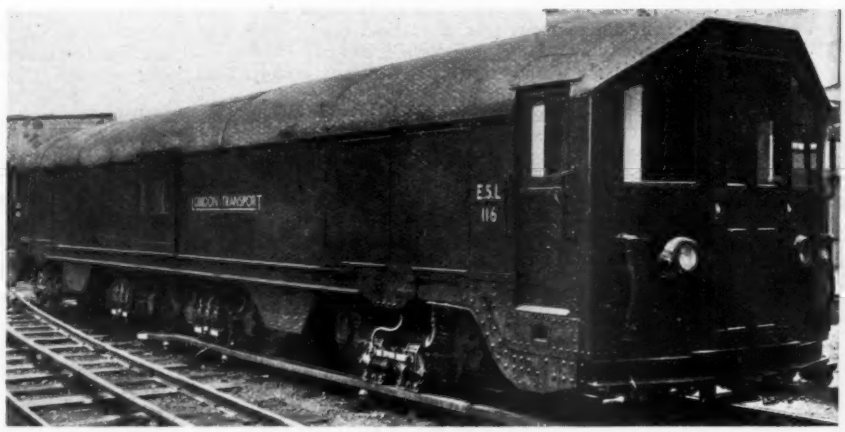
Rail Clearing Apparatus

The so-called sleet gear itself comprises two 75-gal. tanks holding the anti-freeze mixture, which is fed through valves to a spray on each positive and negative beam on the carrying bogies, which are not equipped with current-collecting shoes. These sprays are supplemented on each beam by two stiff wire brushes and a gear-wheel form of ice crusher located between the two brushes. The vertical positions of the crusher and brushes are controlled directly by pneumatic cylinders carried on the beams. All beam groups are controlled as one unit from either end of the locomotive, and as regards the spray to the positive conductor rails the apparatus is governed from the driving position so that as the position of the live rail changes from one side to the other the mixture is fed to the appropriate side only. For use in darkness, an indicator lamp in the cab, governed by feeds from the positive shoes, gives the position of the positive rail.

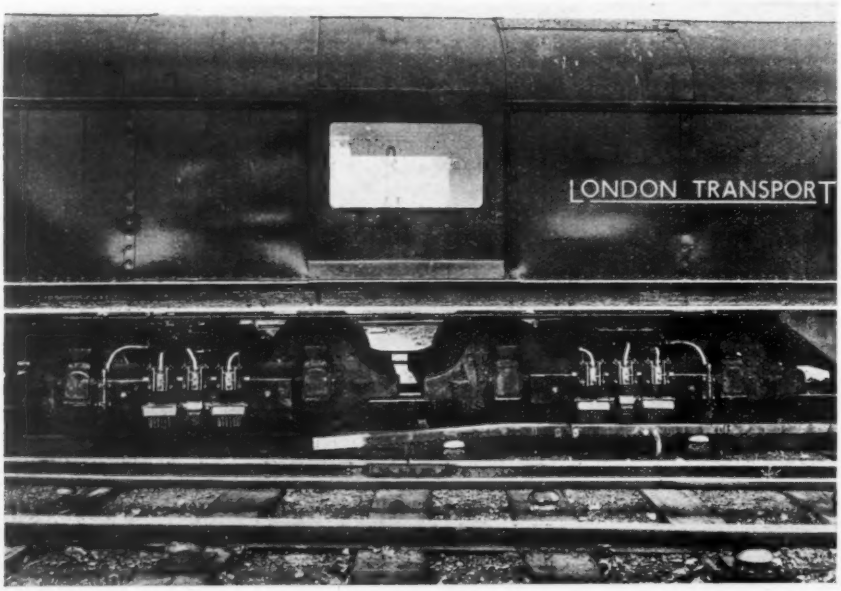
The complete locomotive is just over 50 ft. long, and its weight is supported on the two outer motor bogies, which are pitched at 33 ft. 2½ in. centres and have a wheelbase of 6 ft. The two inner sleet bogies, with a wheelbase of 5 ft., are pitched at 9 ft. 2½ in. centres, but they carry no superimposed weight, and are fitted with a floating pivot arrangement to enable them to move freely in a lateral direction when traversing curves. The weight on the rails at these bogies is only that of the trucks themselves, amounting to about 2 tons 3 cwt. apiece; each driving bogie carries about 18 tons 3 cwt., and the total locomotive weight is just over 40 tons 12 cwt.

Braking and Control Gear

Naturally, no braking equipment is fitted to the sleet bogies, but the motor bogies are braked on the Westinghouse system. The rigging on each bogie is actuated by a separate cylinder but the two cylinders operate simultaneously through the common train-line control. A hand brake in the centre part of the locomotive applies the blocks on one bogie only. Two complete sets of electric traction control equipment are provided to permit of the operation of either or both motor bogies from either cab.



Above: General view of one of the 18 bogie locomotives, rebuilt from old stock by the L.P.T.B. for clearing conductor rails of sleet and ice



Left: Close up view of the sleet and ice removing gear as applied to the positive conductor rails outside the running rails. Each beam group comprises a spray, two wire brushes, and an ice-breaker

EMERGENCY ORGANISATION FOR BOMB DAMAGE REPAIR

An outline of the effective arrangements made by the London Passenger Transport Board, which were severely tested in the Battle of Britain

A GREAT deal of permanent way work is, and has always been, emergency work in effect, and the outbreak of war therefore found well-tried organisations of the main-line railway companies and the London Passenger Transport Board already firmly established for dealing with emergencies, and requiring only to be adapted to meet the altered circumstances of wartime conditions. Before the actual outbreak of war, London Transport had evolved a comprehensive organisation, adjusted to meet expected wartime needs, and held ready to be put into operation speedily. During the continuance of hostilities it is not desirable to give a detailed description of such emergency arrangements, especially as the organisation may be required once more to operate at full pressure at any moment, but Mr. A. C. Edrich has recently contributed an interesting outline to the proceedings of the Permanent Way Institution, and the following notes are extracted from this.

The possibility of a shortage of materials had long been visualised, and large stocks of materials of all kinds had been laid up and dispersed throughout the London Transport system. The successful operation of such an organisation must depend largely on its flexibility. From its inception it was devised with the possibility of alterations and improvements being made from time to time, but the necessary alterations have, in fact, been but slight. The policy governing the organisation has always remained the same, namely, the quickest possible restoration of the services. A headquarters, with deep shelter accommodation, is manned throughout the twenty-four hours by a trained staff capable of dealing with all emergencies. This headquarters maintains close touch with the traffic controllers and others, with a view to the co-ordination of the work of all departments. The dispersal of labour was arranged, and fully-equipped heavy repair squads located at various strategic points. The personnel were carefully selected for their experience as platelayers, knowledge of the board's system, and other special qualifications. Included in these squads, in addition to platelayers and conductor-rail men, were certain specialised grades of tradesmen, such as carpenters, welders, and sewermen, who have repeatedly proved their worth. Rescue, or flying, squads were also formed, consisting of a small number of trained first-aid men each of whom is an experienced railwayman. These squads are provided with adequate equipment for emergency permanent way work, in addition to the equipment necessary for rescue work. Particular attention was paid to the mobility of these squads and they are now completely self-contained units of the greatest possible value, particularly in carrying out light repairs under running traffic conditions. The mechanisation of repair units was devised and special consideration was given to the storage of equipment in order to facilitate its handling, checking, and maintenance.

Arrangements have been perfected for patrolling the London Transport railway system throughout the hours of darkness by means of foot and mobile patrols. The patrols, who are, in effect, the eyes and ears of the whole system, have provided under all conditions an excellent intelligence service of inestimable value. Thanks in large part to the excellent co-operation of the Signal Engineers, every man, wherever he may be, is at all times in telephonic communication with the headquarters, even from the remotest part of the board's extensive system. In a similar manner, the closest co-operation is maintained with the local and regional A.R.P. authorities. In addition to their other activities, the members of the headquarters staff have been specially trained in the detection and classification of unexploded bombs. Having visited the site and classified the type and kind of the bomb, their duties are then mainly confined to liaison as between the Civil Defence Authorities, the Military, and London Transport, with a view to the least possible interruption to traffic.

One of the few changes made in the organisation has been in regard to working hours. Originally, all grades of staff operated on a three-shift basis, the period of duty then being 12 days on each shift, with three leave days at the end of each working period. This served admirably for the first few months of the war, but later it was found that in all but one branch of the organisation 12-hr. shift working, with seven-day working period, was more satisfactory. The exception was provided by the rescue squads. Here it was found, on account of the type of emergency work carried out by these units, that shorter shifts were practical and in every respect desirable. It should be made clear that there is no army of men, complete with equipment, highly trained, fully mechanised, waiting for the enemy to bring it to active life. In point of fact, every unit, on whatever shift it may be working, has a fully-booked maintenance programme previously arranged with which to carry on. Every unit of the organisation works to that programme.

In peacetime, the major portion of the maintenance work was done at night after passenger traffic had ceased. As the result of arrangements made with the Civil Defence Authorities and the Police, adequate lighting is available to carry out certain essential work during the blackout hours, and the remaining work is carried out during daylight hours by special arrangements for possession of the line being made with the Operating Department. A wartime difference in the carrying out of maintenance is that the work is now executed in such a manner as to permit of the withdrawal of some or all of the personnel engaged upon it at very short notice. It has not been found that this has any seriously detrimental effect on the results obtained, and for the large part work proceeds much as before the war. In addition to the stocks of material dispersed throughout the system, the board has on call at various points trains, known as "war trains," equipped with all the material necessary for repair work. Much special equipment is carried on these trains which are, in effect, complete permanent way departments in themselves. These trains are immediately available, complete with the personnel necessary for the operation and the handling of their equipment.

In common with all industries and trades, the Permanent-way Department of London Transport has given much thought to the necessity for adequate protection against the possible use of noxious gases by the enemy, and in order to safeguard the department's personnel a comprehensive range of protective clothing and equipment of all kinds has been furnished to the staff. In order to ensure the efficiency of the anti-gas organisation, tests have been carried out to cover all kinds of permanent-way operations, and much valuable information is at the disposal of the department's officials as to the comparative efficiency of the staff working under such conditions. In addition, care has been taken to provide adequate safeguards with regard to feeding the personnel engaged on the repair of bomb damage, and to this end quantities of suitable foodstuffs have been placed in containers convenient for transport to the site of the damage. Further mobile canteens, providing hot food and drink, are readily brought into operation.

In accordance with standard railway practice, a policy of long-term budgeting in advance for all maintenance work has been adopted. Full use has been made of unlooked-for possession of the tracks, as a result of enemy action, to effect in advance of schedule those repair works which can be so carried out, and much valuable maintenance work has been completed, to the great benefit of the line, at less inconvenience and at lower cost than would otherwise have been

(*Continued on page* 60)

SIGNALLING AT JUNCTION BETWEEN G.W.R. AND S.R.

Through branch and loop lines have necessitated additional signalling, controlled by an electric power frame, electrically interlocked, in an existing large mechanical signal box

TRAFFIC requirements made it advisable to improve the means of communication at an interchange point between the Great Western and Southern Railways.

The signal box previously controlling the original junction and the east end of the station immediately adjacent thereto was one of the largest boxes on the G.W.R. It was at first proposed to control the new connections, which were to be power operated, from levers added to the ordinary frame. This plan was abandoned, and a 36-lever electric power frame was fixed at the east end of the box, containing 18 signal, 9 point, and 9 spare levers, with electric interlocking. Those levers in the old frame which were involved in the new locking combinations were fitted with electric locks and circuit controllers. The power frame is provided with an illuminated diagram of the area concerned, with track-circuit indications normally dark on an ebony Sindanyo panel, and the tracks and signals painted on.

The signal box at the Southern Railway end is of that company's usual design. It has a mechanical frame, and presents no special features. The signals are of the upper-quadrant type, and there is an electric "S" and "W" indicating mechanism working in conjunction with one subsidiary signal. The block working is by means of one-wire Walker instruments on the old S.R. line, but by three-wire three-position instruments on the new lines leading to the G.W.R.

Signals and Points

All running signals on the G.W.R. are, in accordance with that company's practice, of the lower-quadrant type, with tubular posts; those leading to and from the new branch lines are d.c. motor operated, and one carries a 4-way illuminated stencil type route indicator. The new ground shunt signals are of banner pattern, electrically worked but oil lighted. All signals are repeated, in "on" and "off" positions, as also are the lights. The down outer distant signals worked from the box at the west end of the station are also power operated. The points at the G.W.R. end of the layout are worked by d.c. 110-volt machines, with internal locking and combined point and bolt detectors; the detection circuits are fed individually from isolating transformers.

Track Circuits

On the electrified lines of the Southern the track circuits are necessarily of the a.c. type, but on the remainder of the work and the G.W.R. lines, d.c. track circuits are used, fed from cells, trickle charged through transformers and rectifiers from mains, and using standard 9-ohm relays. The track repeat relays used for all controls in the signal box are 12-volt d.c. neutral type. In no case do relay leads exceed 25 yd. in length. Altogether about 80 relays, d.c. and a.c., were needed for various purposes, and are housed in the signal box basement in sheet-steel cupboards, where also the main transformers, rectifiers and batteries are situated and the main 110-volt a.c. 50-cycle supply is available. According to the amount of apparatus to be accommodated at each location, either cast-iron or welded-steel apparatus cases are provided, on concrete foundations adjacent to the cable runs.

Cables and Batteries

Main and control cables are impregnated-paper insulated, lead-covered and steel-wire armoured, carried on 5-way cast-iron brackets on reinforced concrete posts. They vary in size up to 60 core 1/·083, separate cables being used for point operating and detection wires, signal operating and repeating and track-circuit line wires. Between apparatus cases and functions, multi-core or single-core rubber-insulated wire, with asphalt protection overall, is used, buried and protected by 2-in. boarding. In the signal box Ite class wire, braided and treated with flameproof enamel, is used. At the locations the control cables are pot-ended and terminated in sheet-steel cases. All batteries are of nickel-cadmium type, trickle charged.

For interlocking and d.c. 12-volt relay circuits there is a 20-amp.-hr. battery, and another of 120 volts, 100-amp.-hr. capacity for point and signal operation, while two further sets of accumulators situated at convenient sites feed all outside locations through 12-volt d.c. twin feeders. These are charged from rectifiers from 110-volt a.c. mains, which also feed the detection isolation transformers and track circuit rectifiers.

The equipment for the G.W.R. end of the layout was supplied and installed by the Siemens & General Electric Railway Signal Co. Ltd. to the requirements of Mr. F. H. D. Page, Signal Engineer, G.W.R. The work at the new S.R. signal box and at the junction on that company's line was carried out by its Signal & Telegraph Department under Mr. George Ellson, Chief Engineer.

EMERGENCY ORGANISATION FOR BOMB DAMAGE REPAIR (*Concluded from page* 59.)

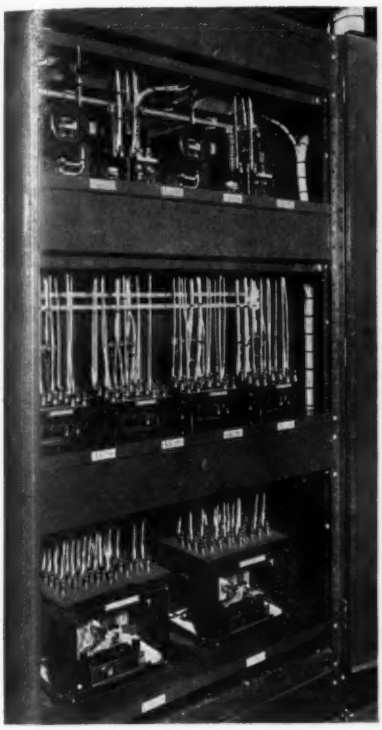
the case. The problem of debris disposal has been of paramount interest. In one instance where a very considerable quantity of brick rubble was a source of great embarrassment, it was ingeniously disposed of by making use of it for the much-needed filling in of hollow timber platforms which had been built with solid walls. With the aid of a small quantity of tar macadam, out-of-date and generally unserviceable platforms were transformed into the most modern type of platform yet constructed. A very considerable saving in manpower, haulage, time, and money, was thus effected.

This emergency organisation is part of the greater organisation of the Department of the Engineer-in-Chief. Many years of practical experience in handling emergencies have stood the staff in good stead, and frequently, during the period of continuous and intensive air raiding known as the Battle of Britain, passengers have travelled to work at their normal time, unaware of the night's activities in effecting rapid emergency repairs to the tracks upon which their train was running.

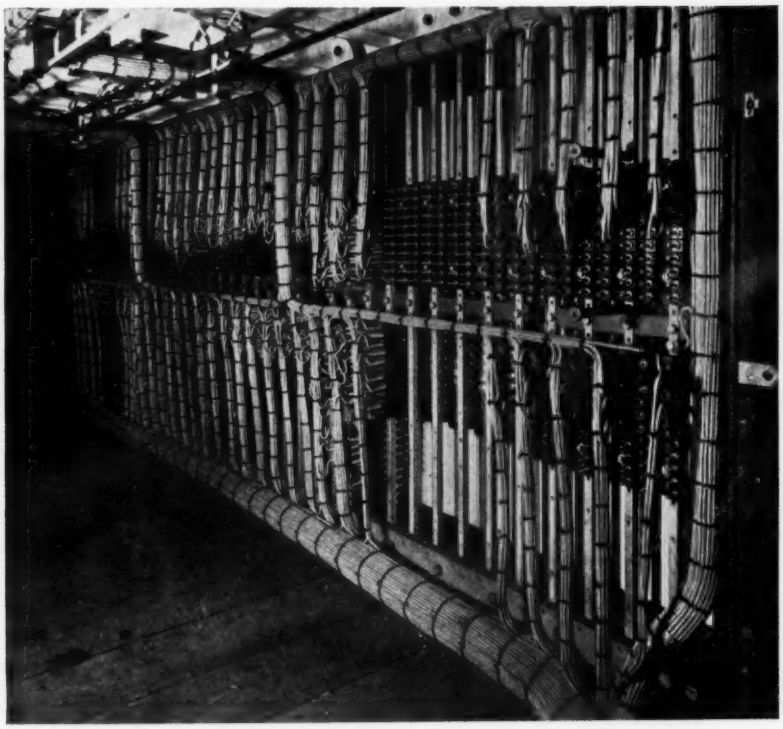
CEYLON GOVERNMENT RAILWAY FINANCIAL RESULTS.—Restrictions on the issue of excursion tickets and the closing of the Uda Pussellawa narrow gauge section to passenger traffic as from January 7, 1940, were among the causes of the fewer passengers on the Ceylon Government Railway during the year ended September 30, 1940. Passenger receipts, however, improved in all classes, and goods traffic was better.

	1938-39	1939-40
Miles open	951	951
Passengers	10,705,516	10,405,985
Merchandise, tons	894,519	1,018,030
Train-miles	4,705,675	4,530,960
Operating ratio per cent.	129·66	123 67
	Rs.	Rs.
Passenger receipts	5,836,581	6,306,876
Merchandise receipts	7,979,272	9,064,728
Gross revenue	15,441,208	17,107,451
Working expenses	20,021,602	21,157,355
Net deficit	4,580,394	4,049,904

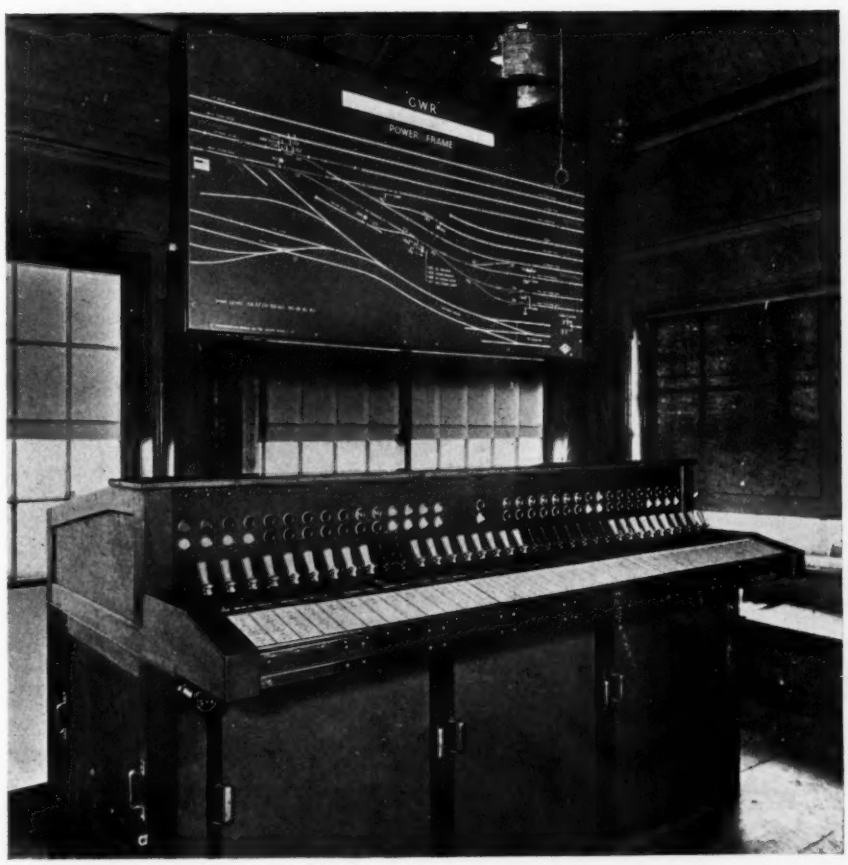
Reasons for the increase in expenditure were the abnormal rise in the cost of coal and other essential commodities and heavy payment of commuted pensions.



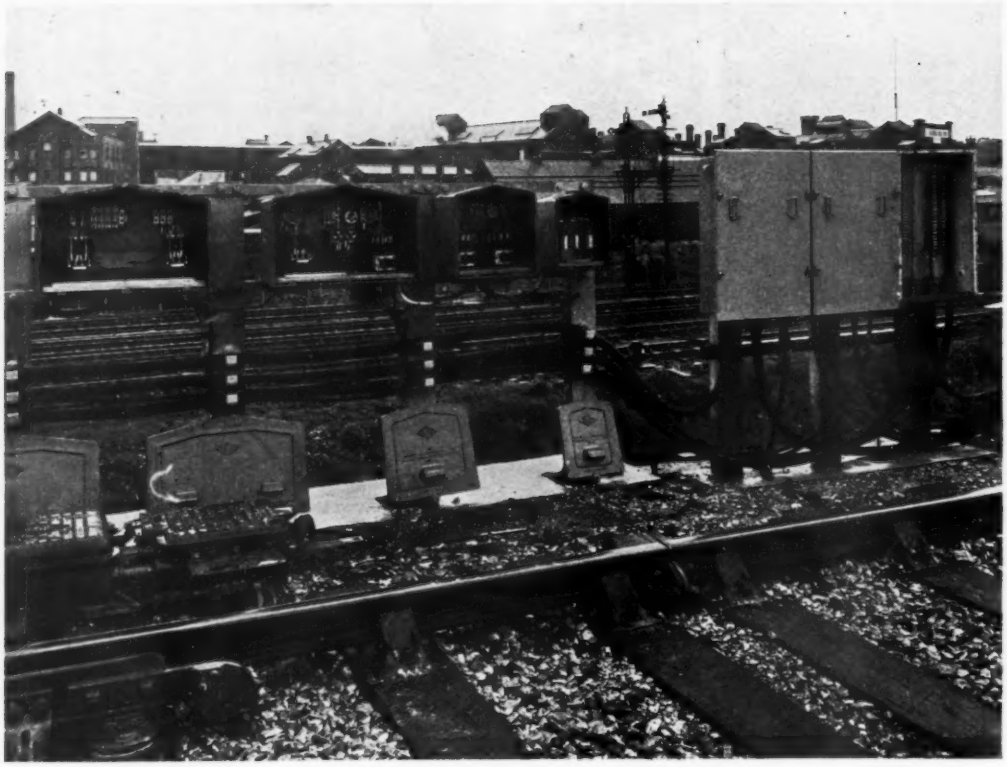
Relays in signal box



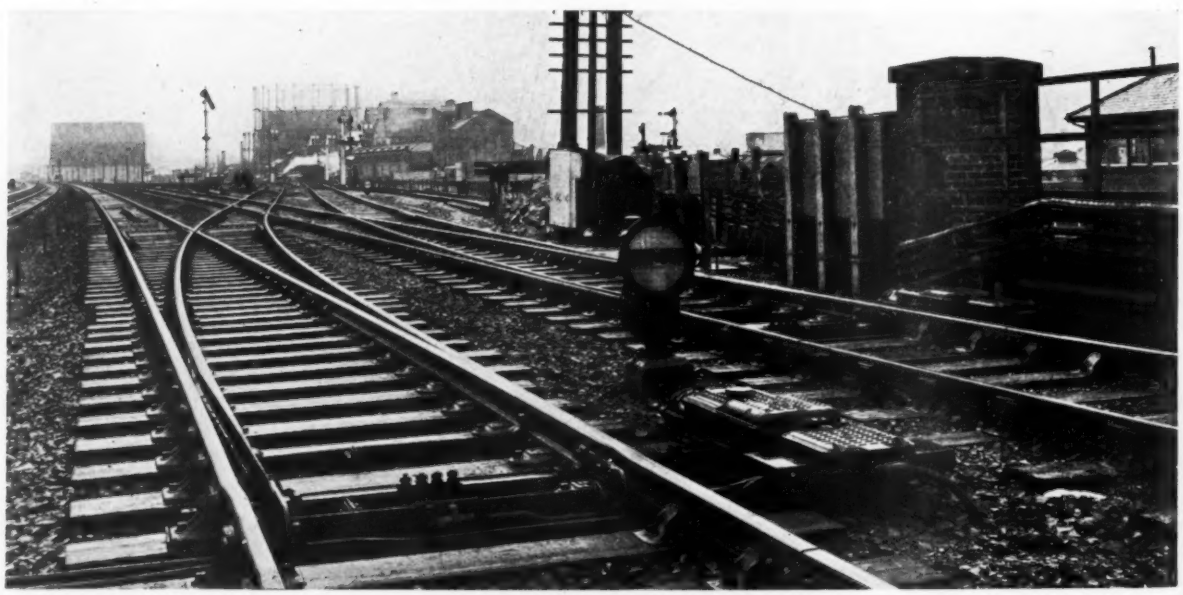
Wiring in lower part of signal box



Right: Electric power frame, with all-electric interlocking, placed in end of existing mechanical signal box to control new junction connections, and track diagram



Track circuit apparatus in cast iron cases, with sheet metal type terminal cases on right



Electric point machines operating connections at junction and electric banner ground shunt signal

SIGNALLING AT JUNCTION BETWEEN G.W.R. AND S.R.

(See article on page 60)

INDIAN NORTH WEST FRONTIER RAILWAYS—II

A brief description of the Khyber Pass railway, the broad-gauge line meeting the second line of approach to India from the north-west, referred to in part I of this article published last week

(*See map on page* 16 *of our issue of January* 2 *and illustrations on pages* 64-5)

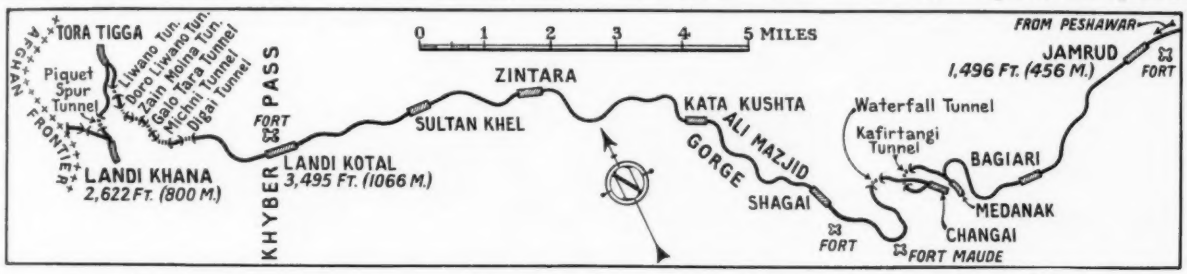
SEVERAL reconnaissances with a view to carrying a narrow-gauge line up the Khyber pass were carried out without any very satisfactory results between 1878 and 1900, but in 1890, a feasible alignment for a railway was believed to have been found, not by way of the pass, but up the Kabul river to the east and north of it. It was not, however, until Lord Kitchener arrived on the scene in 1903 that a modified alignment of the 1890 route was approved, and construction work along it began in 1905. It was a gorge route and proved very difficult and costly, so that in 1908 further work was stopped and in the next year the permanent way was taken up, leaving the tunnels and formation as they may be found today, though probably much damaged by the weather. Meanwhile, in 1901, a broad-gauge line had been constructed from Peshawar across the plain to Jamrud, at the foot of the Khyber pass.

After 1908, no further action was taken until the third Afghan war, in 1919, when immediate danger showed up the inadequacy of the roads over the Khyber pass and demanded a railway. A light railway using the road formation as much as possible was quickly ruled out as impracticable, as was also a suggested alternative approach to the Kabul river route. Lt.-Colonel (now Sir Gordon) Hearn, who was in charge of the survey operations and afterwards of the construction, decided that a railway could and must follow the road over the Khyber pass, though it involved 1 in 25 grades, reversing stations, and a summit 1,000 ft. higher than that on the Kabul river route. The Khyber route was, however, only 35 miles long to the frontier as against 54 miles by the river route; but this 35-mile world-famous line cost about £2,000,000 to construct, and very heavy expenditure has also been incurred subsequently to insure the stability of many of the tunnels and of the formation.

Construction was begun in 1920 and the ascent to Landi Kotal, at the top of the pass, was completed in November, 1925; the descent beyond to Landi Khana was finished shortly afterwards. Just beyond Jamrud station, which is 1,496 ft. above sea level, the abruptly-rising Himalayas are entered. The jaws of the pass are reached at Bagiari, and after passing over a high bridge spanning the valley and both motor and caravan roads, a horse-shoe curve through two tunnels leads to Medanak reversing station, at mile 5 from Jamrud. Climbing beside a *nullah*, the line then doubles back on itself by way of the long Kafirtangi tunnel to reach Changai reversing station, which is just above Medanak as the crow flies. Actually, in a direct distance of ¾ mile, hereabouts, the line rises 340 ft. by developing no less than 4½ miles measured along the centre line. A big S bend leads through six more tunnels to Shagai (mile 10), the end of the steepest part of the ascent, of which the ruling grade is 1 in 33·3. The alignment next runs high up along the precipitous sides of Ali Mazjid gorge, tunnels and retaining walls alternating in quick succession until a flatter sloping valley is reached at Kata Kushta, and easier ground is followed all the way to the summit at Landi Kotal, 3,594 ft. altitude; the gradients with one exception are no steeper than 1 in 40 from Shagai to the summit. Almost exactly 2,000 ft. are, therefore, climbed in the 21 miles from Jamrud.

The steepest and perhaps most difficult part of the line is the descent to the frontier at Landi Khana, 2,622 ft. above sea level. In one stretch two points on the line are 4/5 mile apart in a bee line, but the distance along the railway is 3½ miles and in it the fall is 577 ft. The total fall of 873 ft. is accomplished with the aid of 1 in 25 gradients, another reversing station, and through 10 more tunnels. Landi Khana itself is a reversing station, whence the line runs on to the frontier 1½ miles beyond. Further details of the alignment were published in our issue of May 9, 1924.

Altogether there are in the 26 miles between Jamrud and Landi Khana 34 tunnels with a total length of over 2½ miles,



Plan, showing reversing stations, of the Khyber Pass railway. Only the longer tunnels are shown

The longest measuring 1,400 ft.; 92 bridges and culverts, including one 80-ft., and another 55-ft. high viaduct. The sharpest curve on the line is 7-deg. (819-ft. radius) and 51·8 per cent. of it is curved. Transition curves 105 ft. in length are used, or 15 ft. per degree of curvature, giving a rate of increase in superelevation of 1 in. in 30 ft. (for 25 m.p.h. speed). All gradients are compensated for curvature at the rate of 0·043 per cent. per degree of curvature, as is usual Indian broad-gauge practice.

The permanent way consists of 90-lb. flat-bottom rails laid on *deodar* (wooden) sleepers. Traffic is worked by " HGS " 2-8-0 type locomotives; double-heading or pusher engines of the same class are added as required.

Other Frontier Lines

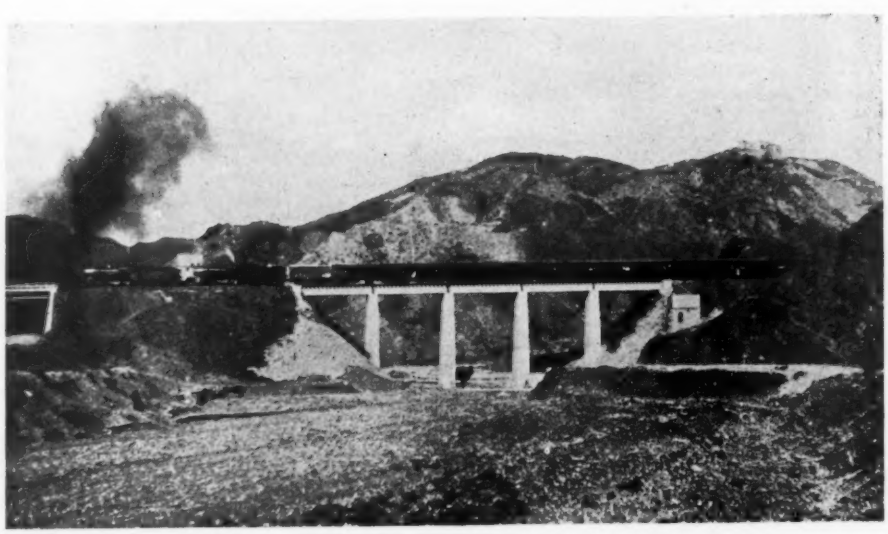
The only other route by which an invasion of India from the north-west might be attempted is southwards from Kabul and by the Kurram valley *via* Thal, and Bannu or Kohat. To meet such a threat, branches of the N.W.R. broad-gauge system run (1) from Rawalpindi to Kohat—crossing the Indus by the famous Khushalgarh bridge; and (2) from the Indus valley line to Mari Indus. In continuation of (1) a 2 ft. 6 in. gauge line runs to Thal, and from Mari Indus another 2 ft. 6 in. gauge line crosses the same river by the Kalabagh bridge—described and illustrated in the March, 1934, issue of our constituent *The Railway Engineer*—and proceeds thence to Laki Marwat junction and Bannu; a branch from that junction serves Tank and Manzai.

All the various frontier railways mentioned above are always in a semi-prepared state for instant mobilisation, and the frequent outbreaks of tribal hostilities since their construction have rendered good service in maintaining that state of preparedness. With such adequate rail communications guarding the very few vulnerable points in that otherwise impenetrable barrier—the great *massif* of the Himalayas flanked by the deserts of eastern Persia and Baluchistan—India is well protected from the north-west.

Views of the Khyber Pass line,

Above: Panoramic view of a typical length of the pass. Seven tunnels are

Right: View looking up the pass showing the formation of the railway on the left whilst still under construction. To the right are the two roads and an overhead cableway. In the middle distance is a fort guarding the jaws of the pass

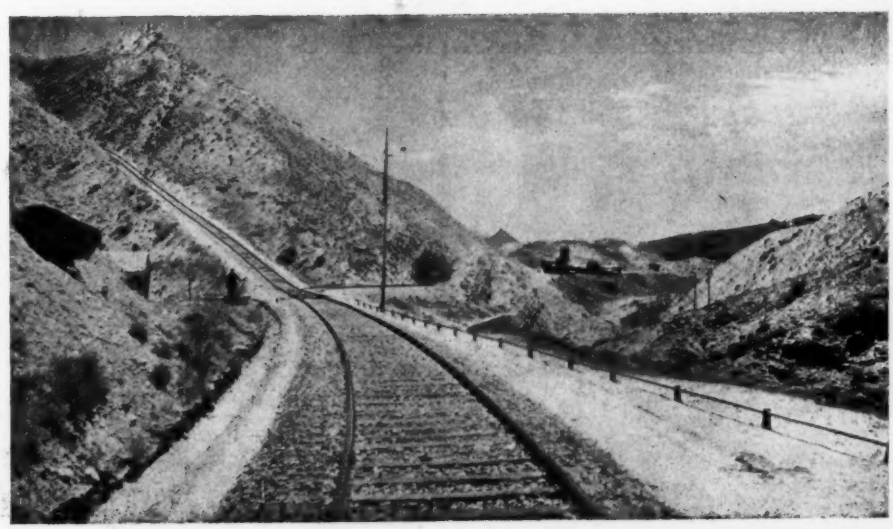


Left: Passenger train hauled by two "HGS" 2-8-0 type locomotives crossing a viaduct 80 ft. in height near the lower end of the pass

North Western Railway, India

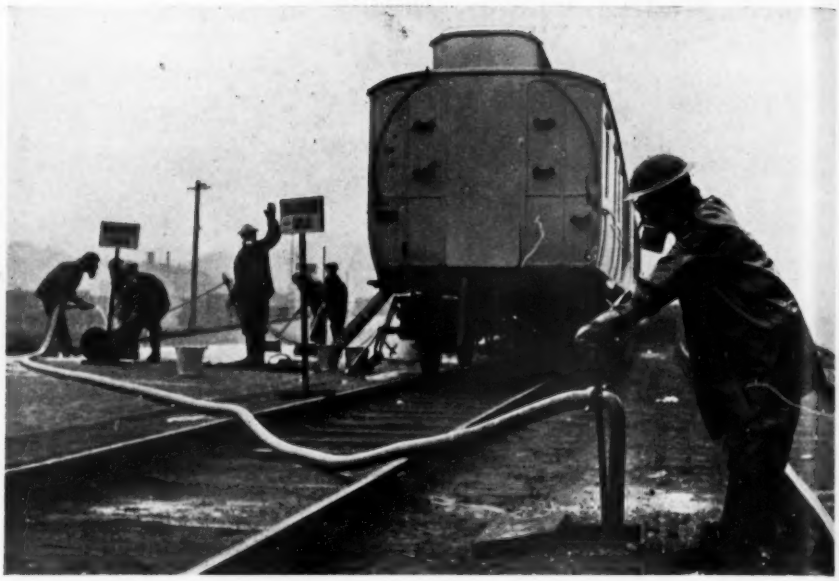
to be seen, and in the foreground the twin roads, one on each bank of the river

Left: Lower entrance to Ali Mazjid gorge during construction. A tunnel heading and beginning of formation may be seen half way up the right-hand side of the illustration. Another fort on the left guards this, the narrowest part of the pass



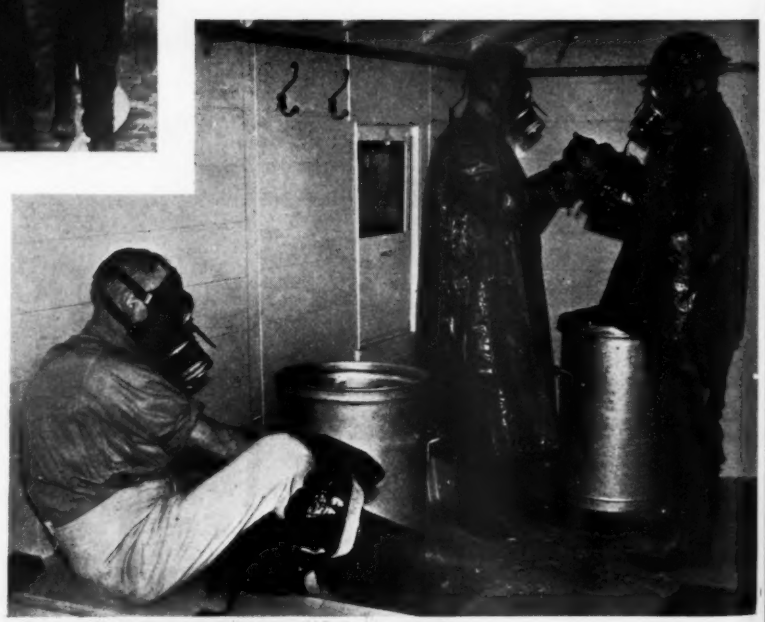
Right: Catch siding on 1 in 33 grade, with points normally set for runaways or breakaways to run into it; they are manually reversed for the passage of trains

British Railways and the War—97



Above: Operating the water supply to G.W.R. special gas decontamination unit, of which a number has been prepared. The units were formerly passenger coaches and are entered by an air lock leading into the dressing room

Above: Members of the G.W.R. decontamination squad at practice



Right: The interior of the decontamination coach. Details of these units are given at page 70

RAILWAY NEWS SECTION

PERSONAL

Sir James Milne, General Manager of the Great Western Railway, has been elected Chairman of the General Managers' Conference. This is the fourth year in succession that he has held this position.

L.M.S.R. Staff Appointments

Mr. F. W. Cotton, Resident Storekeeper, C. & W. Stores, Wolverton, to be Resident Storekeeper, C. & W. Stores Derby, *vice* Mr. T. Winfield, retiring.

Mr. H. Neild, Assistant Head of Orders Section, Chief Stores Superintendent's Office, Watford, to be Resident Storekeeper, C. & W. Stores, Wolverton, *vice* Mr. Cotton.

Mr. F. J. Finney, Chief Inspector, Police Department, Manchester, to be Divisional Superintendent, Liverpool, *vice* Mr. J. Birch, promoted.

The Haulers' National Traffic Pool, which has been constituted as part of the Government road haulage scheme, announces that, with the approval of the Minister of War Transport, Mr. R. W. Sewill, Director of Associated Road Operators Limited, has been appointed General Manager & Secretary of the Pool. Mr. Sewill will be granted leave of absence by Associated Road Operators Limited, while holding this office.

The Secretary of State for the Colonies has approved the following appointments:—

Mr. C. Innes, Assistant Accountant, Sierra Leone Government Railways, to be Chief Storekeeper, Railway Department.

Mr. H. Mills, Senior Divisional Transportation Superintendent, Ceylon Government Railway, to be Operating Superintendent.

The Minister of War Transport has appointed Mr. R. B. Stockdale to be Divisional Road Haulage Officer for the North-Western Division.

We regret to record the death on December 24 of Mr. Harold Butler, Chairman & Managing Director of the Butler Machine Tool Co. Ltd. Mr. Butler, who was in his 66th year, was awarded the M.B.E. for his services to engineering in the last war.

Mr. L. S. Werthmuller has been appointed Signal Engineer of the Missouri Pacific Railroad in succession to the late Mr. P. M. Gault, whose death we recorded in our December 5 issue. Mr. Werthmuller entered railway service in 1912, in the signal maintenance department of the St. Louis terminal division and became Assistant Signal Engineer in 1925, two years before Mr. Gault came from the Illinois Central, and was associated with him in the installation of some of the largest C.T.C. installations. Mr. Werthmuller is a member of the Signalling Economics Committee of the A.A.R.

Mr. O. V. Cromwell, who, as recorded in our issue of January 2, has been appointed Chief Officer for Labour & Establishment, entered the service of the S.E. & C. Railway at Redhill in August, 1901. In June, 1908 he was transferred to the Office of the Superintendent of the Line, and in September, 1911, to the Staff Section of the General Manager's Office; he was apointed Chief Staff Clerk in May, 1919. In March, 1924, on the amalgamation, he was appointed Chief Staff Clerk, General Manager's Office, Southern Railway, and in 1932 he was promoted to Staff Assistant to the General Manager. He is a member of the Staff Committee of the Railway Executive Committee, the Railways Staff Conference Committee, the Railway Staff National Council, and a member of all negotiating bodies dealing with the railway staff. He is also the railway companies' representative on the National Maritime Board. His present appointment is evidence of the importance of staff matters in the war, when many national staff questions have to be imposed upon and dovetailed with the already complicated staff arrangements of the railway companies.

Mr. O. V. Cromwell

Appointed Chief Officer for Labour & Establishment, Southern Railway

Mr. Frank Doherty, Stationmaster, Westland Row, Dublin, Great Southern Railways, has been appointed District Superintendent at Mullingar.

New Year Honours

Barons

The Rt. Hon. Sir (Albert) Charles Clauson, a Judge of the High Court, 1926-38; a Lord Justice of Appeal, 1938-41.

Brig.-General the Rt. Hon. Sir Auckland Campbell Geddes, for public services.

Baronets

Commander Sir Charles Worthington Craven, R.N. (retd.), Controller-General, Ministry of Aircraft Production; Chairman and Managing Director, Vickers-Armstrongs Limited.

Sir Ralph Lewis Wedgwood, C.B., C.M.G., lately Chairman, Railway Executive Committee.

Knights Bachelor

Mr. Henry F. Brand, President, British Employers' Confederation.

Mr. George M. Burt, Chairman, John Mowlem & Co. Ltd.

Mr. Frederick C. Cook, C.B., D.S.O., M.C., M.Inst.C.E., Chief Engineer, Highways, Ministry of War Transport.

Mr. John Fisher, Director of Coastal and Short Sea Shipping, Ministry of War Transport.

Mr. Robert S. Hilton, O.B.E., Deputy Chairman, United Steel Companies Limited; President, British Iron & Steel Federation.

Mr. Guy Harold Locock, C.M.G., Director, Federation of British Industries.

Mr. Percy H. Mills, Controller-General of Machine Tools, Ministry of Supply.

Mr. Bertie M. Staig, C.S.I., lately Financial Commissioner, Railways, India.

Mr. George C. Usher, Director-General of Tank Supply, Ministry of Supply.

G.C.B.

Sir Frank E. Smith, G.B.E., K.C.B., Controller of Telecommunications Equipment. For services to Ministry of Aircraft Production and Ministry of Supply.

C.B.

Mr. W. G. Nott-Bower, Deputy Under-Secretary for Mines.

Mr. R. C. Gelderd-Somervell, Under-Secretary, Board of Trade.

Mr. Charles J. Stewart, O.B.E., Director-General of Production of Engines and Aircraft Equipment, Ministry of Aircraft Production.

K.C.I.E.

Sir George Riddoch Campbell, Kt., lately Shipping Controller for India and Representative of the Ministry of War Transport in India, Burma, and Ceylon.

C.I.E.

Mr. J. R. Harrison, Chief Mining Engineer, Railway Board, Calcutta.

Mr. G. C. Laughton, Agent and General Manager, B.B. & C.I. Railway Company.

C.M.G.

Mr. David Hume Lyal, M.B.E., Director, Department of Overseas Trade.

Mr. J. C. Stronach, Director of Public Works, Kenya.

K.B.E.

Mr. Samuel R. Beale, Member of the Industrial and Export Council of the Board of Trade; Chairman and Managing Director, Guest Keen & Nettlefolds Limited.

Mr. William E. Rootes, Chairman of the Supply Council, Ministry of Supply.

C.B.E. (Civil Division)

Mr. T. P. Bennett, Director of Works, Ministry of Works and Buildings.

Mr. A. Dalton, Superintendent of the Line, Kenya & Uganda Railways & Harbours.

Mr. W. Donald, Director, Port and Transit Control, Ministry of War Transport.

Mr. George Ellson, O.B.E., Chief Engineer, Southern Railway. For services to Civil Defence.

Mr. H. H. Harley, Chairman and Joint Managing Director, Coventry Gauge & Tool Company. For services to the Admiralty.

Mr. F. F. Hixson, Representative in Peru of the Peruvian Corporation Limited.

O.B.E. (Civil Division)

Mr. F. W. Daniel, lately Chief Ship Surveyor, Ministry of War Transport.

Rai Bahadur N. C. Ghosh, Chief Operating Superintendent, East Indian Railway, Calcutta.

Mr. W. W. Graham, General Manager, Hants & Dorset Motor Services Limited.

Mr. W. M. Hind, Transport Accounts Officer for Railways, Ministry of War Transport.

Mr. J. W. Kidd, General Manager, Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Mr. R. H. Maxwell, Regional Director of the British Overseas Airways Corporation, Near East Headquarters, Cairo.

Major C. C. Metcalfe, M.B.E., M.C., Chief Transport Officer, Nyasaland.

Mr. A. E. Reddell, Director of Vickers-Armstrongs Limited; General Manager of the Whitehead Torpedo Co. Ltd.

Mr. Robert Stewart, Sub-District Manager, Road Transport Organisation, Dunoon.

M.B.E. (Civil Division)

Major F. C. Badhwar, Officer Commanding, Technical Group, East Indian Railway.

Mr. Allan P. S. Bell, Assistant Auditor, Traffic Audit Office, B.B. & C.I.R., Ajmer.

Mr. Stephen Broad, Traffic Officer, Class I, British Overseas Airways Corporation.

Mr. Herbert S. Clarkson, Principal Artificer, Transport Department, Southern Rhodesia.

Mr. T. R. Curtiss, Manager, Armour Plate Rolling Mill, Thos. Firth & John Brown Limited.

Mr. Thomas Dooley, Superintendent, Gun & Carriage Department, Metropolitan-Vickers Electrical Company.

Mr. Stephen A. Fitch, General Purposes Assistant to the General Manager, Southern Railway Company. For services to Civil Defence.

Mr. Basil P. Fletcher, District Engineer, Stratford, L.N.E.R. For services to Civil Defence.

Mr. Charles W. Gillmore, Sub-District Manager at West Ham in the Ministry of War Transport road transport organisation.

Mr. Charles R. Grey, Works Manager, Carriage Shops, Moghalpura, North Western Railway, India.

Mr. Cyril H. Griffiths, Chief Engineer, Weymouth, Great Western Railway Company Steamships.

Mr. Robert B. L. Hill, M.C., Senior Shipping Assistant, Ministry of War Transport.

Mr. Martin Naughton, Harbour Yardmaster, Kenya & Uganda Railways & Harbours.

Mr. Edward F. Packer, Chief Assistant to the South Western Regional Transport Commissioner, Ministry of War Transport.

Mr. George H. Partridge, Chief Traffic Inspector, Great Western Railway Company.

Captain Frederick C. Raven, Senior Captain, L.M.S.R. Fleet of Steamers.

Mr. James Smith, Chief Mechanical Engineer, Kowloon-Canton Railway, Hong Kong.

Mr. Brij Bihari Varma, Executive Engineer, East Indian Railway.

M.V.O. (Fifth Class)

Mr. John Davidson (dated September 10, 1941). Mr. Davidson was lately Stationmaster at Aberdeen joint railway station.

British Empire Medal (Civil Division)

Mr. George A. Baker, Assistant to the Divisional Electrical Engineer, London Passenger Transport Board.

Mr. Ernald G. Brentnall, Assistant to Signal & Telegraph Engineer, Stratford, L.N.E.R. For services in Civil Defence.

Mr. John I. Butland, Inspector of Mechanics, Great Western Railway. For services to Civil Defence.

Mr. Percival G. Collins, Stationmaster, Southampton Central station, Southern Railway. For services to Civil Defence.

Mr. Charles Day, Yard Foreman, Aintree, L.M.S.R.

Mr. Horace C. Ford, Stationmaster, Plymouth, Southern Railway. For services to Civil Defence.

Mr. Walter T. Freestone, Engine Driver, L.M.S.R.

Mr. Thomas A. Gentles, Chief Signalling Inspector, Newcastle-on-Tyne, L.N.E.R.

Mr. Archibald George, Stationmaster, Portsmouth, Southern Railway. For services to Civil Defence.

Mr. William J. Howes, Signal & Telegraph Inspector, Great Western Railway. For services to Civil Defence.

Mr. John W. Hunter, Inspector (Trams and Trolleybuses), London Passenger Transport Board. For services to Civil Defence.

Mr. Frederick T. Maddock, Road Superintendent (Central Buses), London Passenger Transport Board. For services to Civil Defence.

Mr. Ambahal U. Patel, Stationmaster, Thika, Kenya & Uganda Railways & Harbours.

Mr. Charanjibal Varma, Stationmaster, Nanyuki, Kenya & Uganda Railways & Harbours.

The Railway Clearing House Centenary. Left: Sir Francis H. Dent, Chairman, with Mr. E. E. Painter, former Secretary. Above (left to right): Messrs. A. A. Forrester, A. C. Everard, C. Grasemann, E. E. Painter, Sir Francis Dent, and Mr. T. J. Lynch

(See pages 29-32, January 2 issue)

TRANSPORT SERVICES AND THE WAR—122

Heavy railway freight movements—London underground trains for Wirral and Mersey service—Army buses for workers—The Victorian Railways and the war—New high-capacity rolling stock in Germany

Records are being set up by the railways for the rapid handling of war freights. Despite the fact that over 60,000 wagons are under load for more than 48 hours, 3,500,000 wagons were forwarded during a recent period, 500,000 more wagons than a few weeks before. Locomotives, carriages, and wagons are all working harder. Heavier loads and longer trains are the order of the day. The average number of loaded wagons in a train has increased considerably, and every wagon is now carrying a heavier load of goods. Loading to capacity of every vehicle is essential.

Among the methods being tried to move the greatest tonnages at the maximum speeds is the system of nominated loading of trucks; senders now know in a number of towns goods for particular destinations are forwarded only on certain days of each week. Complete trainloads of coal known as "block trains" are being run from the collieries to the consuming centres. These "block trains" go from the pits to their destinations without intermediate shunting.

London Tube Shelterers

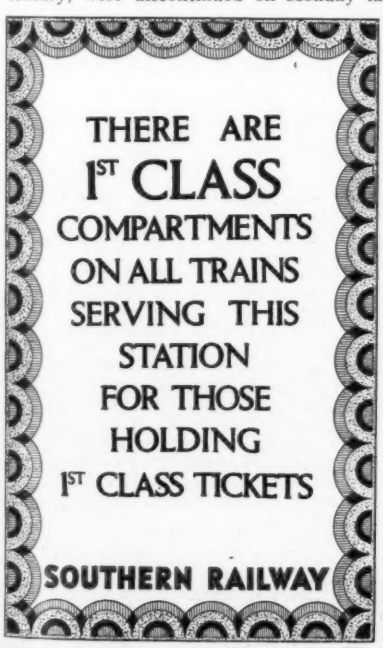
The London Passenger Transport Board has stated that during 1941 some 16,000,000 persons were given shelter at 79 underground stations. Approximately 8¼ miles of three-tier bunks, 7,600 in all, were installed on platforms and in subways. At 124 canteens 300 urns and 90 pie warmers were installed, and 11 tons of food were distributed nightly during the raids.

Southern Railway Restaurant Cars

On Monday last, January 5, Pullman cars were withdrawn from the 8.35 a.m. Victoria to Ramsgate, and the 1.15 p.m. (Saturdays excepted) and 3.45 p.m. (Saturdays only) Ramsgate to Victoria trains. From the same date all restaurant car facilities were withdrawn west of Exeter, with the exception of those on the 12 noon Brighton to Plymouth, and the 10.10 a.m. Plymouth to Brighton trains.

Lancashire Club Trains Discontinued

The business men's club trains, which have been a feature of morning and evening services between Manchester and North Wales, the Lake District, and Blackpool since the beginning of the century, were discontinued on Monday last, January 5, for the duration of the war. The necessity of cutting accommodation on long-distance services has made it impossible to continue reserving extra coaches, which are needed for ordinary passengers.



New standard Southern Railway form of poster for stations served entirely by trains with first class accommodation

London Trains for Liverpool

From the London Passenger Transport Board 6-coach trains are being sent to Liverpool and will be used as reserve rolling stock for the Wirral and Mersey electric services. The 24 cars concerned are of the Hammersmith & City type and are now being reconditioned and painted the standard lake colour of the L.M.S.R. The trains will be steam-hauled to Liverpool. The cars in their new livery are reminiscent of the old District Line cars which were formerly painted lake. Certain modifications are being made to render the cars suitable for the Mersey Railway, notably the fitting of Mersey Railway pattern negative shoe and beam; alterations to tripcocks; earthing of negative bus line for working on the Wirral third rail system; and coupling adaptors.

G.W.R. Staff in the Forces

During the year 1941 the number of the Great Western Railway Company's employees serving with the Colours or in full-time Civil Defence services has increased by some 4,000 to an approximate total of 12,000 in all. In order to offset this temporary loss of personnel, women have been recruited to the service for the duration of the war in large numbers. Today there are in the company's service some 1,500 women porters, as well as substantial numbers working as van guards, carriage cleaners, ticket collectors, and in other positions that are usually filled by men. Members of the staff of all grades and in all parts of the system have enrolled in large numbers in the Home Guard. The total serving in this way exceeds 13,000.

Recent versions of the railway compartment notices enjoining conversational care

Food Transport Order

The Minister of Food has made the Food Transport Order, 1942 (S.R. and O., 1941, No. 1694), taking power to give directions as to the transport of food and animal feeding-stuffs. The Order requires every food undertaking to comply with such directions as the Minister of Food may make on the transport of food produced or used by the undertaking. Under the Order, the Minister may also prohibit the movement of foodstuffs and feeding-stuffs, or lay down the method of transport, the route which must be followed, and the time at which consignments must be made in moving food between particular parts of the country. The Minister may also name the actual places of consignment and of destination, where food is moved between particular areas. It is intended that these powers shall be used where necessary to enforce compliance with schemes for avoiding unnecessary long hauls of foodstuffs, or the cross movements of foodstuffs in opposite directions. Generally, such schemes will be drawn up with the agreement of the food trades concerned, and

compulsory powers will be used only where they are necessary to ensure compliance. The Order will also enable the Minister to direct food traffic so as to avoid congesting the railways at places where the traffic for the time being may be specially heavy, and, by spreading large movements of food over all the transport services and by timing them conveniently, to ensure that foodstuffs reach the consumer with greater certainty than if they are left to make their own way.

Priority Travel

There have recently been further extensions, in various parts of the country, of the policy of giving to workers priority of road travel.

On January 1 the priority travel scheme of the Western Welsh Omnibus Co. Ltd. was put into operation. Certain persons working under (*a*) " Essential Works Order," (*b*) " Protected Establishments Registration Order," (*c*) Government Departments (Direct Employ), who do not travel to and from work in special workers' buses have been issued by their employers with a priority card entitling them to preference in boarding buses during specified times on certain routes.

Since December 15 Tyneside workers have been given preference on buses between 5 and 6 p.m. on production of their works passes or a certificate from their employer.

G.W.R. Gas Cleansing Coaches

The Great Western Railway now has special rail A.R.P. cleansing vans, situated at various points on the system, which can be rushed to any station or depot where either there are no facilities for cleansing decontamination squads or where the intensity of a gas attack renders existing arrangements inadequate. The units, which are painted a distinctive mustard colour, were formerly passenger coaches attached to main-line trains. They are entered by an air lock leading into the undressing room, supplied with bins for holding the contaminated clothing. Having undressed, members of the squad pass through another air lock into a zinc-lined washing room, fitted with showers supplying hot and cold water, and having a special draining floor. From there they move into the drying room and then, through another air lock into the dressing room, which is fitted with seat lockers containing fresh clothing for the squad. The coaches are fitted with steel blinds which can be raised to afford protection against blasting of the windows as well as acting as part of the ordinary blackout scheme of the coaches. Some illustrations are reproduced at page 66.

Army Buses for Workers

Fleets of Army buses have been loaned to the Ministry of War Transport to convey workers to and from munition factories. They will be run and maintained by Army personnel, and any profits will go into Government funds. No existing employee will be displaced, and working conditions of civilian drivers and conductors will not be affected. Ordinary fares will be charged. The season ticket system will apply wherever possible, in which case no conductors will be needed, but on other routes the bus companies will supply conductors. The Army buses are being allotted to the Regional Transport Commissioners in the areas where the greatest difficulties have been experienced. Some are to serve Birmingham and Coventry, others have been based on York, and others have been sent to Glasgow. The object of the arrangement is to ease the difficulty of black-out travelling. The buses have been loaned only until the end of January, and they are subject to recall at a moment's notice in the event of an emergency. Regional Transport Commissioners are endeavouring to make agreements with the commercial transport undertakings working in the areas concerned.

Details concerning the operation of Army buses in South-West Scotland were discussed at a conference in Glasgow on December 29. The Regional Traffic Commissioner presided, and the meeting was attended by bus operators and military representatives. It was agreed that depots should be established in Glasgow, Paisley, and Kilmarnock to serve workers in Lanarkshire, Renfrewshire, and Ayrshire. Certain of these Army buses began to run on January 2. They are not available to the public.

C.P.R. Employees' $50,000 for Canadian Air Force

Employees of the Canadian Pacific Railway on November 28 presented a cheque for $50,000 to the Royal Canadian Air Force, in the Windsor station (Montreal) concourse. This money, the proceeds of the Golden Aircraft Fund, a purely employee war effort, will buy two fighter planes for Canada's air fleet. Presentation of the cheque, subscribed to by C.P.R. employees from coast to coast and in the United States, was made by Mr. C. E. Stockdill, Assistant to the Vice-President, Western Lines. It was received by Air Commodore Albert de Niverville, Air Officer Commanding No. 3 Training Command, who handed it over to Air Vice-Marshal G. O. Johnson, M.C., Deputy-Chief of the Air Staff in Ottawa. Approximately $3,000 subscribed in addition to the $50,000, has been assigned to the relief of air-raid victims.

The great variety of jewellery and other contributions to the Golden Aircraft Fund, the desire of all employees to do everything in their power to combat the forces of Hitlerism, and their pleasure in being able to give $50,000 to the R.C.A.F., were described in opening addresses by Miss Gladys Gowlland and Mr. E. L. Guertin. Miss Gowlland, who presided at the ceremony, originated the idea of the fund. Mr. Guertin spoke on behalf of the employees.

U.S.A. Railways Extend Special Fares for Forces

The U.S.A. railways have agreed to continue until October 31, 1942, the special fare of 1.25 cents a mile for the uniformed personnel of the Army, Navy, Marine Corps, and Coast Guard, when travelling on furlough in uniform at their own expense, according to an announcement of the Association of American Railroads. The arrangement also applies to cadets, midshipmen, and nurses of the various branches of the service.

U.S.A. Troop Conveyance by Rail

Railways of the United States in the first nine months of 1941 moved 2,027,857 members of the Armed Forces of the nation, according to the military transportation section of the Association of American Railroads. Of this number 1,235,265 were handled on 4,112 special trains. The remaining 792,592 were moved in groups on ordinary scheduled trains. In September, 1941, 170,308 members of the military service were moved by railways. Of that number 109,475 were handled on special trains and 60,833 travelled on regular trains. Among those conveyed in September, 1941, were 37,118 selectees. These figures as to the number of members of the Armed Forces transported by the U.S.A. railways both in the first nine months of 1941 and in the month of September, do not include soldiers, sailors, marines, selectees, or members of the Civilian Conservation Corps, who travelled while on furlough.

Priority for U.S.A. Roads

A few weeks before the Japanese attack on the U.S.A., the American Office of Production Management (Priorities Division) announced an extensive programme to provide material needed for the development of a strategic network of highways approved by the War Department. Classes of roads to be given priority ratings include access roads to military, naval, and defence manufacturing establishments, and roads constructed by the Government for work on national park and forest projects. This priority assistance covers materials needed for new roads, improvements of sub-standard roads, grade separation structures, bridges, tunnels, and drainage structures. President Roosevelt has made it clear that during the present emergency he does not intend to submit estimates of appropriations or approve allocations of funds for any project which does not have important value in the national defence.

The Victorian Railways and the War

The report of the Victorian Railways Commissioners for the year ended June 30, 1941, copies of which have just reached this country, records that up to June 30 last, 1,399 officers and employees had enlisted or been called up for service with the 2nd Australian Imperial Force or the Royal Australian Air Force or Navy. They included :—

543 Labourers or semi-skilled employees
410 Stationmasters, assistant stationmasters, signalmen, guards, shunters, porters, loco. enginemen, etc.
167 Clerks and professional officers
148 Gangers and repairers
131 Artisans and apprentices

In addition, 202 had been called up or had enlisted for Home Service for an indefinite period, while 115 had been loaned to Commonwealth Departments to assist with war activities, and another 63 had been granted leave of absence to undertake or be trained for the manufacture of munitions outside the service. The departmental activities on the manufacture of munitions, etc., absorbed the equivalent of a large number of employees. To assist in meeting the shortage of artisans, 194 semi-skilled employees were stepped up as " added tradesmen " under the Commonwealth Dilution of Labour Regulations. It will be appreciated that these figures do not embrace the men called up under the universal defence training scheme. The release of staff for this purpose is regulated, by agreement with the Defence authorities, in accordance with the fluctuations of the railway business and its staff requirements. By this means it has been practicable to release all grades of employees at appropriate times, except tradesmen and apprentices in engineering trades, whose services cannot be spared because of the programme of munitions work.

Assistance was given by the Commissioners and a number of senior officers on various committees and conferences associated with problems arising out of the war. Splendid efforts have been made by a committee representative of the whole of the staff in the formation and activities of the Victorian Railways Patriotic Fund. Up to June 30 the total amount raised was £8,027, of which £7,202 was represented by cash and £825 by goods manufactured by voluntary labour. Of this amount £5,583 had at the same date been expended in the provision of two army ambulances, and in donations to the Australian Comforts Fund, Australian Red Cross,

British Bombing Victims, Greece War Victims, and other movements connected with the war. In addition, almost £1,000 has been paid to district war funds by country auxiliary committees.

Mexican Railway Precautions

The Mexican West Coast Railway, which runs through the Pacific military zone, is reported to have been placed under military control on December 15. The Atlantic-Pacific Railway, across the Isthmus of Tehuantepec, is to be made a double-track line, for which purpose it is hoped that a U.S.A. loan will be granted. The Mexican Ambassador to the United States is endeavouring to speed up delivery of 1,000 freight cars and 30 locomotives promised to Mexico.

Athens Tramway Suspension

The tramway services in Athens were suspended towards the end of December, leaving the city without local transport, according to messages from Istanbul.

Roumanian-Bulgarian Frontier Traffic

The frontier between Roumania and Bulgaria has been closed since December 23 because of German troop movements, according to Moscow and Istanbul reports.

Civilian Motor Traffic Discontinued in Bulgaria

Civilian motor traffic has been discontinued throughout Bulgaria in accordance with a Government Decree issued early in December. This measure is stated to have been imposed as a result of the acute shortage of motor fuel and lubricants, all available quantities of which are being reserved for the armed forces.

Danube Shipping

All Hungarian shipping companies operating on the River Danube have suspended goods traffic until further notice, owing to winter conditions, according to a Reuters Budapest message of December 30.

New Jugoslav Frontier Stations

On the 275 mile 2 ft. 6 in. gauge railway line between Belgrade and Sarajevo Mokra Gora and Vardište have recently been established as frontier stations. Mokra Gora is on Serbian territory 292 km. (181 miles) from Belgrade, while Vardište is 12 km. (7 miles) further to the west on what is today known as Croatian territory.

Slovak Railway Developments

With the recent completion of double track on the 60-km. (37-mile) Racistorf-Leopoldov section north of Bratislava (Pressburg), double-line working is now in operation over the whole 215 km. (133 miles) of main line running from Bratislava northwards through the Vah Valley to Žilina, the junction with the Bohumin (Oderberg)-Kassa (Košice) main line running roughly west to east. The Bratislava-Žilina main line has now been reconstructed for speeds of up to 150 km. (93 miles) an hour.

High-Capacity Rolling Stock in Germany

Demands for the transport of raw materials over long distances in Germany have been met by the construction of new standard types of open wagon, with a load capacity up to the maximum permitted axle load on German main lines of 20 metric tons. Two new standard types were designed, one with high sides, and the other with medium or low sides. The undercarriages are of welded steel, and the bodies of wood reinforced with steel. The wheelbase has been increased to 6 m. (about 20 ft.). Some of the wagons have hand brakes, but the brakesman's cabin is absent, and an open platform, 2 ft. wide, is provided at one end instead. The low-sided wagons are used for ore transport, and the high-sided ones for coal and construction materials, such as sand and cement. The same wagons when used for agricultural products cannot be loaded to the full weight capacity. Either empty or loaded, the new wagons may be hauled at speeds up to 70 km. per hour (44 m.p.h.). Comparative dimensions with the old standard type are as follow :—

	Old	New high sided	New low sided
Weight, metric tons	10·5	10·6	10·5
Load capacity, metric tons	21	29	29
Weight fully loaded, metric tons	31·5	39·6	39·5
Length, inside	7·72 m. (25 ft. 4 in.)	8·72 m. (28 ft. 7 in.)	8·72 m. (28 ft. 7 in.)
Width, inside ...	2·756 m. (9 ft.)	same	same
Area, load ...	21·3 sq. m. (229 sq. ft.)	24 sq. m. (258 sq. ft.)	same
Height of sides	1·55 m. (5 ft.)	1·55 m. (5 ft.)	1 m. (3 ft. 3 in.)
Loading volume	33 cu. m. (1,165 cu. ft.)	37·3 cu. m. (1,317 cu. ft.)	24 cu. m. (847 cu. ft.)
Length over buffers ...	9·1 m. (29 ft. 10 in.)	10·1 m. (33 ft. 2 in.)	same
Wheelbase ...	4·5 m. (14 ft. 9 in.)	6 m. (19 ft. 8 in.)	same

It is reported that these new types of wagon are being manufactured under mass production schemes. Earlier references to the placing in service by the Reichsbahn of about 14,000 high-capacity wagons for intensified cereal traffic were made in our issues of September 26 (page 311) and November 21 (page 538). The cereal wagons are stated to have a capacity of between 40 and 50 metric tons.

German Rolling Stock for Eastern Front Billets

It is reported that the improvisation by the German Forces on the Eastern Front of temporary warmer quarters for the winter includes the use of railway passenger cars in tens of thousands. Apparently this was decided upon a few weeks ago, and the drastic reduction of private passenger traffic in Germany and in the occupied countries as from November 1 (see our issues of November 7, page 483, and December 19 & 26, page 675) was a result.

Reduction of Railway Transit Rates in Spain

The minimum freight rate of 30 centimos per *tonne* and kilometre for consignments in transit to and from Portugal, introduced on the Spanish railways on October 25, 1941, was cancelled as from December 1, 1941. The same rates as used for the Spanish home freight consignments are now also applied to the transit consignments. This benefits particularly those neutral continental countries which have to rely on the railways of Spain for the maintenance of their overseas trade.

Danish Transport Minister's Visit to Germany

Herr Larsen, the Danish Minister of Transport, recently visited Dr. Dorpmüller, the Reich Transport Minister, to discuss further co-operation between the railways of the two countries. It is stated that the new Fehmarn ferry route was one of the most important subjects settled. Herr Larsen was subsequently taken on a tour of inspection over railways in the Berlin, Ruhr, Strasbourg, Nuremberg, and Munich districts, following a programme identical to the one used by the Swedish Minister, as reported in THE RAILWAY GAZETTE of October 31 (page 436). Herr Larsen was the only Danish Minister to support the Danish Prime Minister's decision to sign the anti-Comintern Pact at the recent Berlin meeting.

Danish Air Company Takes Over Berlin-Vienna Line

By request of the Deutsche Luft Hansa, the Danske Luftfartselskab has taken over, as from December 1 last, the Berlin-Vienna service. On the route the demand for accommodation is said to be increasing rapidly, and it is expected that the Danske Luftfartselskab will be able to take full advantage of the capacity of its large Condor aircraft.

Financial Results of Italian Air Lines

Ala Littoria, the largest Italian air transport concern, showed a net profit of 1,910,000 lire for the financial year ended June 30, 1941, compared with 1,960,000 lire for the preceding financial year. The company's share capital is 90,000,000 lire. No traffic figures or other particulars are disclosed.

Lati (Linee Aeree Transcontinentali Italiane) the Italian air company operating the air service between Italy and South America, showed a net profit of 2,940,000 lire for the financial year ended June 30, 1941, compared with 1,450,000 lire for the preceding financial year which, however, comprised only seven months of working.

Hungarian Air Traffic Development

Malert, the Hungarian air transport company, records for 1941 a total distance flown of more than 621,000 miles, against 496,800 miles covered in 1940. The company is at present engaged in modernising the three civil aerodromes situated in that part of Transylvania Roumania was forced to relinquish in 1940, namely, Cluj (Hungarian, Kolozsvár), Targu Mures (Hungarian, Marosvásárhély), and Oradea Mare (Hungarian, Nagyvarad). Work in connection with a new aerodrome at Vecsés, 9 miles to the south-east of Budapest, is also in hand, and a summer aerodrome is planned at Gheorgheni (Hungarian, Gyergyószentimiklós), a summer resort in the eastern Carpathains, also taken over from Roumania. Of the total expenditure envisaged, amounting to 21,700,000 pengö (for the whole scheme, including also a motor road between Budapest and Vecsés), 6,000,000 pengö have been expended up to the present, and a further 5,000,000 pengö will be required in 1942. The following services are operated by Malert at the present time :—

Budapest-Vienna-Breslau-Berlin
Berlin-Prague-Vienna
Budapest-Arad-Bucharest
Budapest-Zagreb-Milan-Rome

World Fuel Position

It was reported from Cape Town on November 25 that sales of petrol between noon on Saturdays and 6 a.m. on Mondays had been banned throughout South Africa.

Oil Engines in Britain

It has been estimated recently that 50,000 high-speed oil engines operate in road transport service in this country, and that they save about £10,000,000 a year in fuel bill compared with the cost if they all burned petrol. If these 50,000 oilers were converted to petrol engines they would consume about 300,000,000 gal. of petrol a year, which would require another 50 ocean-going tankers to bring the fuel to this country.

RAILWAY AND OTHER MEETINGS

The Madras & Southern Mahratta Railway Co. Ltd.

The ordinary general meeting of the Madras & Southern Mahratta Railway Co. Ltd. was held at "Guildcroft," Epsom Road, Guildford, Surrey, on December 30, 1941. Brig.-General Sir Charles L. Magniac, C.M.G., C.B.E., Chairman of the company, presided.

The Secretary (Mr. V. Craster, O.B.E.) having read the notice convening the meeting and the auditors' report,

The Chairman said that capital expenditure at Rs. 3.37 lakhs represented a minimum, as nothing but urgent works had been undertaken. Gross earnings had been Rs. 813·28 lakhs, an improvement of Rs. 48·24 lakhs compared with 1939-40. Working expenses had been lower by Rs. 7·85 lakhs and net earnings had increased by Rs. 56·09 lakhs.

As to the stockholders' revenue account, an interim dividend of 2¾ per cent. had been paid last July, and a final distribution of 3 per cent. on January 1 was recommended for approval, that was 1¾ per cent. guaranteed interest, ¼ per cent. from the stockholders' revenue, and 1 per cent. from the reserve fund, making a total of 5¾ per cent. for the year, which was the same rate as paid in the previous two years. After the payment of this dividend, the balance in the stockholders' account to be carried forward to the current year would be about £53,000, compared with £48,000 in 1939-40.

Certain questions as to the incidence of income tax were outstanding between the company and the tax authorities in this country and in India. The company had appealed against the assessment of the guaranteed interest to Indian tax. The appeal had not yet come up for hearing, and the Government of India had agreed to postpone collection of the tax until the decision of the Madras High Court was known.

Road Transport Competition

In previous years he had mentioned the competition by road interests, which had resulted in considerable losses of passenger earnings. Due to the control exercised under the various Road Traffic Acts by local Governments, to which this company could represent its case, matters had been put on a more equitable footing. In order to economise in the use of petrol, Government restrictions recently had been placed on the running of public service vehicles. This, under existing war conditions, would probably result in the transfer of a certain amount of passenger traffic to this railway, as the only alternative means of transport, but it had not to be forgotten that these restrictions were likely to be temporary only. It had been already reported that a number of vehicles were being converted to use fuel other than petrol and will again be put into road service.

Due to ill-health, Sir Francis Couchman had resigned his seat on the board some three months ago. To fill this vacancy, the board had appointed Mr. P. H. Maflin, late member of the Indian Railway Board and Agent of H.E.H. the Nizam's State Railway, whose long experience of Indian railway administration would, it was confidently anticipated, be of benefit to the company.

Of the £2,000 which had been voted by the stockholders at the general meeting last year, £1,150 had been expended to date on various funds, which, it was considered, were deserving of support.

The audited results of working the company's and State lines for the first half of the year to September 30 last showed an increase in gross earnings of about Rs. 83·73 lakhs over the corresponding period of the previous year. Working expenses were up by Rs. 18·83 lakhs and net earnings were Rs. 64·90 lakhs higher.

The traffic returns to the end of November continued to show an upward trend, and it was therefore confidently anticipated that the total receipts for the year would exceed those for 1940-41. The effect of war conditions continued to be felt and an increasing rise in working expenses had to be expected, particularly under such items as coal and stores, and also to meet a dearness-of-living allowance to the lower-paid staff in India. The company also had to make over certain rolling stock to the Government of India to meet military requirements.

The report and accounts were adopted.

A Remarkable L.M.S.R. Wartime Run

A notable example of time recovery on the L.M.S.R. Western Division main line is deserving of record. The train concerned was the 1 p.m. from Euston to Glasgow, which on Tuesday, December 16, was made up to fifteen vehicles weighing 443 tons tare and 475 tons gross, and left Crewe 15 min. late, hauled by streamlined Pacific No. 6237, *City of Bristol*. Winsford junction, 8·7 miles, was passed in 12 min. 3 sec., and after a sustained 69 m.p.h. past Acton Bridge, Weaver junction, 16·2 miles, in 18 min. 43 sec., at slightly reduced speed; over Moore troughs the maximum was 69 m.p.h., and the minimum up the 1 in 135 to Acton Grange viaduct was 60 m.p.h.; Warrington, 24·2 miles, was passed in 26 min. 18 sec., with 3¾ min. regained. Then came severe signal checks, to 30 m.p.h. at Winwick junction and 25 m.p.h. at Wigan, and a stop outside Preston, after which the train was passed across to the extreme western platform in order to get through without further delay. Wigan, 35·8 miles, was passed in 42 min. 3 sec.; Euxton junction, 45·5 miles, in 54 min. 23 sec., Preston, 50·9 miles, in 64 min. 20 sec., and Oxheys, 52·2 miles, in 67 min. 43 sec., with the train still 13¾ min. late. A clear road was now obtained, and of this the best possible use was made. Attaining 64½ m.p.h. at Brock troughs, the engine ran over the slightly rising grades on to Galgate at 62½ to 65 m.p.h., eased through Lancaster, touched 69 m.p.h. at Carnforth, and climbed 2½ miles at 1 in 134 to Burton at a minimum of 53½ m.p.h., afterwards reaching 66 m.p.h. before the long ascent to Grayrigg was tackled. The 8·2 miles from Oxheys to Garstang took 8 min. 52 sec., the 11·5 miles thence to Lancaster 11 min. 17 sec., the 6·3 miles from Lancaster to Carnforth 5 min. 58 sec., and the 7·3 miles on to Milnthorpe 6 min. 59 sec.—total, 33·3 miles from Oxheys in 33 min. 8 sec. Oxenholme, 91·0 miles, was passed in 107 min. 26 sec., with the train now only 6½ min. late. Up the 1 in 124-131 of the lower part of Grayrigg bank speed was maintained steadily at 37½ m.p.h., and the minimum on the final 2 miles at 1 in 106 was 31 m.p.h., the 7·1-mile climb from Oxenholme taking 11 min. 7 sec.; the level 6·0 miles from Grayrigg to Tebay took 6 min. 41 sec., with a maximum of 68 m.p.h. at Dillicar troughs. An admirable climb of the 4 miles at 1 in 75 to Shap summit was completed at a minimum of 31 m.p.h., the 5·5 miles from Tebay taking 9 min. 10 sec.; the Summit box, 109·6 miles from Crewe, was passed in 134 min. 24 sec., and the express was now only 2½ min. late. With a fast descent, speed finally reaching the permissible maximum of 75 m.p.h., the 13·5 miles from Shap Summit to Penrith were run in 13 min. 2 sec., and Plumpton, 127·9 miles, was passed in 151 min. 55 sec., on time. The engine was now eased, but even so Carlisle, 141·0 miles, would have been reached 2 min. early, in 165 min. from Crewe, had it not been for a lengthy signal check and then a stop of 2 min. outside the station. The actual time from Crewe to Carlisle was thus 170 min. 4 sec., or 12 min. less than schedule, but careful assessment of the delays shows that those from Warrington to Preston inclusive cost 9 min., and the final delay 5 min., leaving a net time of 157 min., or 25 min. less than the timetable booking of the train. The driver of No. 6237 was A. Whitfield, Polmadie shed, Glasgow, and he deserves all credit for a performance practicall up to the best peacetime standards.

Staff and Labour Matters

Building and Civil Engineering Order

Building and civil engineering labour is very scarce and the Minister of Labour & National Service (after consultation with the Minister of Works & Buildings) has made a new Order to assist him in ensuring that labour is placed where it is most required, that it is used economically in the national interest, and fairly to all concerned. It will ensure that an employer does not collect and transfer from one job to another a labour force to which he has no exclusive claim, thereby possibly denuding a district and preventing other efficient but less fortunate contractors from securing the labour needed to complete important work.

The Building & Civil Engineering (Restriction on Transfer) Order, 1941, provides in general that no building or civil engineering employer may transfer an employee from one site to another without the permission of the National Service Officer; there are exemptions to enable employers to move key workers and men in special classes of trade.

Whenever a man's employment is terminated notification of the fact must be made at an employment exchange without delay both by the employer and by the man, subject to certain exemptions. Further details of the scope and working of the Order are set out in a leaflet entitled "Control of building and civil engineering labour" which may be obtained free at any employment exchange.

DALKEITH STATION.—Dalkeith station, L.N.E.R., is closed for passenger train traffic from January 5, 1942. Parcels conveyed by passenger trains are now dealt with at Eskbank station, but goods, mineral, and livestock traffic continue to be dealt with at Dalkeith goods station.

The "Cunard White Star" Locomotive

Naming Ceremony at Charing Cross of the fourth Southern Railway engine of the "Merchant Navy" Class

Sir Percy Bates, Chairman of Cunard White Star Limited, performed the naming ceremony at Charing Cross station, Southern Railway, on January 1, of the fourth of the Southern Railway "Merchant Navy" class mixed traffic locomotives, to which the name *Cunard White Star* has been assigned.

Sir Percy was received by Mr. Robert Holland-Martin, Chairman of the Southern Railway Company, Mr. E. J. Missenden, General Manager, and other officers of the railway, and then inspected a detachment of Southern Railway Home Guard and A.R.P. workers.

Proceeding to the locomotive, which was drawn up at platform No. 6, Mr. Holland-Martin referred appreciatively to the action of Mr. O. V. Bulleid, Chief Mechanical Engineer, Southern Railway, in inviting to the ceremony foremen from the Ashford and Eastleigh Works who had actually been engaged on building the engine, and said that work in connection with the maintenance of our internal line of transport was assisting the war effort in exactly the same way as the work of those men who had built 1,000 wagons in record time for service in the Middle East. Mr. Holland-Martin continued that there were some today who regarded it as an unnecessary extravagance in wartime to bring out new locomotives and designs, but he felt that it was the correct course not to let the war interfere with improvements tending towards greater efficiency. The connection of the Southern Railway and its predecessors with the Cunard White Star Line was one of old standing and great affection. The provision by the railway of docks and graving docks to accommodate the world's largest ship was an essential part of the services rendered by the Cunard White Star Line and all looked forward to the day when Southampton would again be the greatest passenger port, and the Cunard White Star Line would once more weave still closer the bonds between ourselves and Canada, and between ourselves and the U.S.A.

Sir Percy Bates said that there was a very real partnership between his company and the Southern Railway. Had it not been for the courage and enterprise of the railway the big ships of the Cunard White Star Line would never have come into existence. He regarded the ceremony as placing a seal on the partnership and friendship and looked upon it as a happy omen that the two companies should begin the new year with this mark of the bond between them. He then drew apart curtains in front of the nameplate of the locomotive and mounted the footplate to inspect the cab.

Later, Sir Percy Bates was presented with a coffee table, the top of which was a facsimile of the centre-piece of the nameplate of the locomotive which bears the house flags of the Cunard White Star Line.

Among those present were the following representatives of the Cunard White Star Limited: Sir Percy Bates (Chairman), Sir T. Royden, Mr. Herbert Corry, Mr. J. R. Rooper, Mr. B. R. Drover, Mr. B. H. Russell, Mr. C. E. Cotterell.

Other present included Mr. Robert Holland-Martin (Chairman, Southern Railway Company), Rt. Hon. Sir George L. Courthope, M.P. (Director, S.R.), Sir Francis H. Dent (Director, S.R.), Mr. E. J. Missenden (General Manager, S.R.), Mr. J. Elliot (Deputy General Manager, S.R.), Mr. R. M. T. Richards (Traffic Manager, S.R.), Mr. G. Ellson (Chief Engineer, S.R.), Mr. H. E. O. Wheeler, (Superintendent of Operation, S.R.), Mr. O. V. Bulleid (Chief Mechanical Engineer, S.R.), Mr. C. Grasemann (Public Relations & Advertising Officer, S.R.), Mr. A. Cobb (Locomotive Running Superintendent, S.R.), Mr. E. A. W. Turbett (Mechanical Engineer, Eastleigh Works, S.R.), Mr. E. Burrow, (Assistant to Docks & Marine Manager, S.R.), Lt.-Colonel H. C. Prescott (Chief of Police, S.R.), Mr. J. Harrington (General Assistant to General Manager, S.R.), Mr. W. J. Shorter (Assistant to Public Relations & Advertising Officer, S.R.), Mr. J. A. Kay (Editor, THE RAILWAY GAZETTE), Mr. J. F. B. Vidal (J. Stone & Co. Ltd.).

PAPER AND METAL SALVAGE RESULTS

Many counties are achieving fine results in their collection of paper and metal. This is shown by the salvage figures for October recently issued. The figures are based on an average collection for each 1,000 of the population. The quota aimed at is 20 cwt. for each 1,000.

PAPER

	cwt.
Lincoln	26·1
Gloucester	20·4
Suffolk	18·1
Leicester	17·9
Norfolk	17·6
Lancashire	17·3
London	17·1
Surrey	16·7
Middlesex	15·2
Somerset	14·8

METAL

	cwt.
London	20·6
Suffolk	16·2
Lancashire	16·1
Lincoln	16·0
Middlesex	13·3
Norfolk	12·8
Essex	12·0
Warwick	10·9
Yorkshire	10·6
Northampton	10·4

CENTRAL WORKSHOP AT STOCKHOLM FOR AEROTRANSPORT COMPANY.—Negotiations are in progress (December, 1941) between Aerotransport Aktiebolaget, Sweden's national air transport concern, and the administration of Stockholm for the cession to the company of an area close to Bromma, the Stockholm civil aerodrome, on which the company intends to erect a central workshop. It is expected that the workshop will be available by the summer of 1942, when all activity at the workshops at both Stockholm and Malmö will cease and the whole repair work will be centralised at the new workshop.

The naming ceremony of the Southern Railway Merchant Navy Class "Cunard White Star." Left: Sir Percy Bates, Chairman of the Cunard White Star Limited, chatting with foremen from the works. Above: Mr. R. Holland Martin, Chairman, Southern Railway Company, and Mr. E. J. Missenden, General Manager, at the unveiling ceremony

Notes and News

Italian Railway Accident.—It was reported by Reuters on December 21 that a train on the Vesuvius Railway was derailed while entering a station, causing the death of 25 persons.

U.S. Railways Passenger Rates.—The Association of American Railroads has decided to ask for a 10 per cent. increase in basic passenger fares to help to compensate for the increase in the payroll incurred by the recent compromise wages settlement.

Canadian Pacific Railway. — Gross earnings for November, 1941, were $20,208,000, an increase of $4,319,000, and expenses were $15,007,000, or $4,190,000 higher. Net earnings at $5,201,000 were $129,000 more than for November, 1940. For the first eleven months of 1941 gross earnings were $200,242,000, an increase of $45,613 000 and the net earnings of $40,867,000 were $10,034,000 greater than for the first eleven months of 1940.

Canadian National Railways.—Gross earnings during November last were $27,292,966, an increase of $4,903,518, and operating expenses were $21,573,130, an advance of $4,707,906, leaving net earnings $195,612 higher, at $5,719,836. Aggregate gross earnings for the eleven months from January 1, 1941, were $276,365,487, an increase of $52,575,069, and the net earnings of $60,347,891 showed an improvement of $21,614,029.

Continental Railway Accidents.—As a result of a collision between a passenger and a goods train at Novi Bosanki, Jugoslavia, last week, seven persons are reported to have been killed. A railway accident on December 30 near Hazebrouck, about 25 miles west of Lille, is reported to have caused 50 deaths. Thirty-eight persons were killed in an accident on December 27 to a Berlin-Warsaw express. The express collided with a stationary train during darkness in a snowstorm, according to Reuters, between Frankfurt-on-the-Oder and Posen.

Great Southern Railways (Eire).—For the 50th week of 1941 the Great Southern Railways (Eire) reports passenger receipts of £47,743 (against £37,282), and goods receipts of £86,622 (against £67,571), making a total of £131,365, against £104,853 for the corresponding period of the previous year. For the 51st week of 1941 the passenger receipts were £41,446 (against £45,000) and goods receipts £45,863 (against £33,549), making a total of £87,309, against £78,549 for the corresponding period of the previous year. The aggregate receipts to date are passenger £2,033,293 (against £1,802,818), goods £2,883,043 (against £2,528,489), making a total of £4,916,336 (against £4,331,307).

Burma Railway Results.—Approximate earnings of the Burma Railways for May, 1941, amounted to 4,768,000 rupees, compared with 3,569,000 for May, 1940. Earnings for April and May, the first two months of the 1941-42 fiscal year, were 9,790,000 rupees compared with 7,251,000 for the first two months of the 1940-41 fiscal year, Freight receipts for May, 1941, reached 3,561,000 rupees, against 2,465,000 in May, 1940. Passenger receipts were 1,168,000 rupees, against 1,042,000 rupees. Miscellaneous receipts decreased from 62,000 rupees in May, 1940, to 39,000 in 1941. For April and May, 1941. freight receipts totalled 7,318,000 rupees, against 5,005,000 for the comparable period of 1940. Passenger receipts were 2,388,000 rupees, compared with 2,099,000 for April and May, 1940; miscellaneous receipts decreased from 147,000 rupees for the first two months of the 1940-41 fiscal year to 84,000 in 1941-42.

Buenos Aires Transport. — Shareholders in the City of Buenos Aires Transport Corporation have approved the raising by the Corporation of a loan of 40,000,000 pesos. The money is required for financing the expropriation of further bus and "colectivo" undertakings.

Agreed Charges.—Applications for the approval of agreed charges under the provisions of the Road and Rail Traffic Act, 1933, have been lodged with the Railway Rates Tribunal. The applications may be inspected in London at the District Manager's Office, London Midland & Scottish Railway, Broad Street Station, E.C.2, and printed copies of the procedure may be obtained from the Railway Rates Tribunal, Bush House, Aldwych, W.C.2. Notices of objection to any of the applications must be filed with the tribunal on or before January 13, 1942.

TAL-Y-CAFN IS SALVAGE MINDED

Tal-y-Cafn, a little village in Wales, has got the salvage habit. Mr. Hughes, the L.M.S.R. stationmaster, is the moving spirit. He, and his staff of two, decided that the Tal-y-Cafn district had to be salvaged and, enlisting the aid of farmers, a coal merchant and a grocer to do the carting, they have collected:—

A wagon load of scrap metal.
A wagon load of waste paper
50 bags of bottles, equal to a wagon load.
150 old coal sacks.

L.M.S.R. Extension of Time Order.—The Minister of War Transport has made the L.M.S.R. Extension of Time (No. 3) Order, 1941 (S.R. & O., 1941, No. 1895), extending by three years the time limited by:—(1) Section 37 of the L.M.S.R. Act, 1936, for the completion of works Nos. 1 and 2 authorised by the Act of 1931; (2) for the acquisition of certain lands authorised to be acquired by the Act of 1938 at Rugby, Baginton, Hampton-in-Arden, Coventry, and Birmingham.

The Eccles Collision, L.M.S.R.—The inquest on the bodies of the 20 persons killed in the accident at Eccles on December 30, briefly recorded last week, was opened on January 3 and adjourned until January 16. It was before daylight that the 6.53 a.m. train Kenyon Junction to Manchester Exchange, which had just left Eccles, was in oblique collision with a train from Manchester to Pennington. The latter cut through the middle of the former, wrecking several coaches. Over 80 persons were injured.

Southern Railway Extension of Time Order.—The Minister of War Transport has made the Southern Railway (Extension of Time) Order, 1941 (S.R. & O., 1941, No. 1894), extending by three years the time limited by:—(1) Section 14 of the Southern Railway Act, 1938, for the compulsory purchase of lands at Twickenham and Okehampton; (2) Section 31 of the Act of 1938 for the compulsory purchase of lands required for the construction of widenings in Camberwell and Deptford, in Millbrook, and in Bournemouth, authorised by Section 26 of the Act of 1926; (3) lands in Southampton, authorised to be acquired by the Act of 1926; (4) lands in Heston and Isleworth authorised by the Act of 1929;. (5) lands in Crawley authorised by the Act of 1932; and lands in Leatherhead required for Railway No. 1 authorised by the Act of 1935.

Clogher Valley Railway Abandonment.—After we closed for press last week we learned of the withdrawal on December 31 of both passenger and freight services on the Clogher Valley Railway. Transport facilities in the area are pro-

British and Irish Railway Stocks and Shares

Stocks	Highest 1941	Lowest 1941	Prices Jan. 2, 1942	Prices Rise/Fall
G.W.R.				
Cons. Ord.	43¾	30¾	45	+ 2½
5% Con. Pref. ...	109½	83½	108½	—
5% Red. Pref. (1950)	105½	96½	105	+ 1
4% Deb.	113½	102½	110½*	— 1
4½% Deb.	115	105½	112*	— 1
4½% Deb.	121½	112	118½*	— 1
5% Deb.	132	122	128*	— 2
2½% Deb.	70	62¾	68*	— 1
5% Rt. Charge ...	129½	116	126½*	— 1
5% Cons. Guar. ...	128	110½	126½	—
L.M.S.R.				
Ord.	17¼	11	19	+ 1¾
4% Pref. (1923) ...	53	33½	52½	+ 2
4% Pref.	68½	48½	68½	+ 2
5% Red. Pref. (1955)	97⅛	77	94½	—
4% Deb.	105½	97	104½	+ 2
5% Red. Deb. (1952)	110½	106½	109½	—
4% Guar.	100	85½	98½	+ 1
L.N.E.R.				
5% Pref. Ord. ...	3½	2½	4	+ ⅛
Def. Ord.	2	1½	2½	+ ⅛
4% First Pref. ...	52½	33	51½	+ 2
4% Second Pref. ...	19⅜	10	20	+ 1
5% Red. Pref. (1955)	79½	52	77½	+ 1
4% First Guar. ...	90½	74½	88½	+ 1
4% Second Guar. ...	80½	59	78½	+ 2
3% Deb.	79½	68¾	77½	+ 1
4% Deb.	104	91½	102½	+ 1
5% Red. Deb. (1947)	106	102½	104	—
4½% Sinking Fund Red. Deb.	103½	99⅛	190½	—
SOUTHERN				
Pref. Ord.	65½	43½	63½	—
Def. Ord.	15⅝	9	16	+ ⅜
5% Pref.	107	77½	106½	+ 1
5% Red. Pref. (1964)	107	89½	104½	—
5% Guar. Pref. ...	128	111	126½	—
5% Red. Guar. Pref. (1957)	114½	107½	113½	—
4% Deb.	112	102½	109½	+ 1
5% Deb.	130½	119	128½	—
4% Red. Deb. (1962–67)	108½	102	107	—
4% Red. Deb. (1970–80)	108½	102½	107	—
FORTH BRIDGE				
4% Deb.	99½	90½	98½	+ 1
4% Guar.	99	85½	98½	+ 1
L.P.T.B.				
4½% "A"	120½	109½	117½	+ 1
5% "A"	130½	115½	127	— ½
4½% "T.F.A." ...	103½	99½	100½	—
5% "B"	117	102	115½	+ 1
"C"	46½	28½	40	—
MERSEY				
Ord.	24½	19½	22½	—
4% Perp. Deb. ...	100	90	99½	—
3% Perp. Deb. ...	73½	63	72½	—
3% Perp. Pref. ...	58	51½	56	—
IRELAND				
BELFAST & C.D.				
Ord.	4	4	4	—
G. NORTHERN				
Ord.	14½	3	14	+ 1
G. SOUTHERN				
Ord.	14½	5	12	— 2
Pref.	17	10	11	— 4
Guar.	44	16	38	— 4
Deb.	61	42	55½	— 3½

*ex dividend

OFFICIAL NOTICES

ASSISTANT ENGINEER required by the Sierra Leone Government Railway for two tours of 12 to 24 months with possible permanency. Salary £475 rising to £840 a year. Free passages and quarters. Candidates age 24 to 40, must be Associate Members of the Institution of Civil Engineers or hold degree exempting them from Sections A and B of the Institution's examination, and have had three years' experience of railway civil engineering work. Applications from students of the Institution who possess the necessary practical experience will be considered. Write stating age and full particulars of qualifications and experience to Central Register (E 365), Ministry of Labour and National Service, Queen Anne's Chambers, Tothill Street, London, S.W.1.

IT is desired to secure the full commercial development in the United Kingdom of BRITISH PATENT No. 496,426, which relates to Knuckle couplers for railway vehicles, either by way of the grant of licences or otherwise on terms acceptable to the Patentees. Interested parties desiring copies of the patent specification and further particulars, should apply to STEVENS, LANGNER, PARRY & ROLLINSON, 5 to 9, Quality Court, London, W.C.2.

ASSISTANT ACCOUNTANT required for the Sierra Leone Government Railway for two tours of 12 to 24 months with possible permanency. Salary £400 rising to £720 a year. Free passages and quarters. Candidates must have had at least 7 years' experience in the Accountant's Department of a British or Colonial Railway, be experienced in goods and coaching audit work and be familiar with the preparation of revenue and expenditure accounts and returns and with the preparation and use of Traffic Statistics. Write, stating age and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/9862.

vided by the Northern Ireland Road Transport Board, which has modified its bus timetable and allocated additional goods vehicles to the area. The impending abandonment of this railway, under the Clogher Valley Railway & Roads Act (Northern Ireland) of November 4, 1941, formed the subject of a leader at page 3 of our January 2 issue.

Employee Suggestions in Illinois.—Since the Employee Suggestion System was established on the Illinois Central Railroad in 1939, more than 43,500 suggestions have been made, of which more than 10 per cent. have been adopted. Employees have received approximately $45,000 in cash awards.

Railway Road Motor Services in Italy.—The I.N.T. (Istituto Nazionale Trasporti) founded by the Italian State Railways some years ago with a view to meeting the increased competition of private road motor services, recorded a new profit of 520,000 lire for the year ended June 30, 1941, against 405,000 lire a year earlier. Out of this the dividend absorbed 468,000 lire; the share capital is 25,900,000 lire. The I.N.T. services have been developed considerably in recent years and are stated to have been of value in the raionalisation of the use of the State Railways freight rolling stock. Particulars of this service formed the subject of a note in our Road Transport Section of December 19 and 26 (page 655).

Railway and Other Reports

Costa Rica Railway Co. Ltd.—3¼ per cent., less tax, was paid on January 1, 1942, on account of interest arrears on the 6½ per cent. first mortgage debentures. A similar payment was made on September 1 last.

Buenos Ayres Western Railway Limited.—The directors are paying on February 25 one half-year's arrears of interest to July 1, 1941, on the 4 per cent. and 5 per cent. debenture stocks. In July, 1941, a moratorium scheme was sanctioned postponing payment of interest until June 30, 1943, with yearly extensions to 1945.

Villa Maria & Rufino Railway Co. Ltd.—This company received in the year ended June 30, 1941, from the Buenos Ayres & Pacific Railway Co. Ltd., and has paid, interest on the first debenture stock, but no payment was received in respect of dividend arrears on the 4½ per cent. guaranteed stock, such payment being postponed under moratorium schemes.

Bahia Blanca & North Western Railway Co. Ltd.—The board reports that the guaranteed rental of £440,000 due from the Buenos Ayres Great Southern Railway Co. Ltd., in respect of the year ended June 30, 1941, has been received, and that the interest of £98,000 on the 4 per cent. first debenture stock, the interest of £135,000 on the 4½ per cent. second debenture stock, and the dividend of £207,000 on the 4½ per cent. guaranteed stock have been duly paid.

Trans-Zambesia Railway Co. Ltd.—Gross receipts of the railway, including the southern approach to the Zambesi bridge, for the year 1940 were £167,657 (£172,878), and working expenses £111,295 (£110,841), leaving net receipts £56,362 (£62,036). Working expenses, including the southern approach and river service, were 65·98 per cent. (63·74 per cent.) of the gross receipts. Passenger traffic receipts were £23,630 (£24,730) and goods traffic receipts £130,071 (£135,759). The amount of £46,774 due from the Nyasaland Government has been received, and this, with the balance of £57,360 from revenue account, covers interest charges and the £35,550 set aside for debenture redemption account.

LONDON TRANSPORT PAPER SALVAGE

538 tons of paper were salvaged during 1941 from London Transport road and rail vehicles

Argentine Great Western Railway Co. Ltd.—Under the working agreement this company received from the Buenos Ayres & Pacific Railway Co. Ltd. and distributed in respect of the year ended June 30, 1941, £136,000 in interest on the first and second debenture stocks, paid January 1 and July 1, 1941. In addition the Pacific Company has during the year under review paid to the Great Western Company £272,600, out of which payment of arrears of interest on the Great Western company's 5 per cent. debenture stock has been made up to October 1, 1936. Under a scheme of arrangement sanctioned on October 20, 1941, the moratorium period in respect of interest on the 5 per cent. debenture stock and of dividends on the 6 per cent. guaranteed preference stock has been extended to June 30, 1942, with power to the stockholders' committee to extend it to June 30, 1944. Paying goods and livestock traffic amounted to 2,395,142 tons, compared with 2,121,648 tons in the previous year.

Heenan & Froude Limited.—Net profit for the year to August 31, 1941, was £58,741 (£50,046). Provision for taxation is £35,000 (£30,000), and the final dividend is again 5 per cent., making 10 per cent. for the year (same), together with a cash bonus of 5 per cent. (same), all less tax. After appropriating £5,000 (£10,000) to general reserve, £11,787 (£10,765) is carried forward. Further shares in Caprotti Valve Gears Limited have been acquired, making it a subsidiary.

Beyer Peacock & Co. Ltd.—A full year's dividend arrears to June 30, 1934, is being paid on the 5½ per cent. cumulative preference. The previous payment was in July last, when six months' dividend to June 30, 1933, was distributed.

Questions in Parliament

Railway Workshops

A large part of the Government work (other than normal railway work) which is being done in railway workshops will be subject to terms and conditions now under negotiation between the railway companies and the Admiralty, the Ministry of Supply and the Ministry of Aircraft Production. Some work is being done under fixed price contracts and is subject to normal contract conditions. (Mr. Harold Macmillan, Joint Parliamentary Secretary, Ministry of Supply, December 19.)

Contracts and Tenders

On October 1, 56 railway locomotives were on order in the United States for foreign account. Exports during the first eight months of last year aggregated 267 locomotives valued at $3,363,000. Prospects for increased export trade depend on the defence programme, although it is expected that business will increase under the Lease-Lend programme.

Class I railways placed 64,680 new freight wagons in service in the first ten months of 1941, according to the Association of American Railroads. New freight wagons put in service in the same period of the previous year totalled 54,791. Of the total number of freight wagons installed in the ten-month period last year, there were 34,128 box, 26,412 coal, 1,583 flat, 1,853 refrigerator, 123 stock and 581 miscellaneous.

New locomotives placed in service in the same period totalled 493, of which 117 were steam and 376 electric and diesel. In the first ten months of 1940 320 new locomotives were installed, of which 84 were steam and 236 electric and diesel.

Class I railways on November 1 last year had 80,504 new freight wagons on order, compared with 27,459 on the same day of the previous year. New freight wagons on order on November 1 last year consisted of 53,452 box, 22,169 coal, 326 stock, 2,059 flat, 1,730 refrigerator, and 769 miscellaneous. The railways also had 611 new locomotives on order on November 1, of which 284 were steam and 327 electric and diesel. New locomotives on order on November 1, 1940, totalled 196, consisting of 131 steam, and 65 electric and diesel.

Railway Stock Market

Although only moderate improvement was reported in Stock Exchange business, prices in most sections were inclined to show good response to small increase in demand; very little selling has been in evidence. Sentiment was again assisted by the trend in British Funds and also by general confidence as to the ultimate outcome of the war. Railway securities remained a prominent feature, yield considerations and next month's dividend announcements having drawn further attention to junior stocks of the home railways, and South American railway issues showed further response to the increased demand for Latin-American products expected to result from the entry of the U.S.A. into the war. Steady buying continued for home railway prior charges, which in some instances have been in very short supply. Current dividend estimates in respect of the junior stocks range from 4 per cent.—4½ per cent. on Great Western ordinary; 1½ per cent.—2 per cent. on L.M.S.R. ordinary; 1¼ per cent.—2 per cent. on Southern deferred; and from 2 per cent.—2¼ per cent. on L.N.E.R. second preference. It should, of course, be realised that it is very difficult to form any definite view as to dividend prospects because of the uncertainty as to liability for war damage. In most quarters there would be satisfaction if the lower rates of dividend mentioned above were forthcoming; they are, of course, the same as those paid for 1940. Despite the recent improvement in prices, yields on this basis are substantial, that on L.N.E.R. second preference being approximately 10 per cent., that on Great Western ordinary nearly 9 per cent., while L.M.S.R. ordinary and Southern deferred yield almost 8 per cent. At the time of writing, a slightly easier tendency has developed in the junior stocks on realisation that market talk of the possibility of increased dividends must be regarded in the nature of guesswork. Nevertheless, prices were again better on balance, and if the market trend is favourable, they may, of course, move higher because of the attractive yields. Among South American railway issues buying again centred mainly on the debentures and preference stocks, but there was speculative activity in the ordinary stocks which also moved higher. The above table of some representative securities shows extreme prices last year and current prices.

	Highest 1941	Lowest 1941	Current price
B.A. Gt. Southern ord. ...	10⅜	3¼	10
Do. 5% pref.	28⅛	10	27
Do. 4% debs.	58	37	60½
B.A. & Pacific 4% debs. ...	70½	53½	69
Do. 5% debs. ...	24	5½	22
B.A. Western ord.	8⅞	2½	8½
Do. 4½% pref. ...	21	6½	21
Do. 4% debs. ...	50	26	52
Central Argentine ord. ...	8⅞	2½	7⅞
Do. 6% pref.	28½	10½	25½
Do. 4% debs.	44	19½	42½
Antofagasta 5% pref. ...	34½	17	32
Leopoldina 4% debs. ...	35	12	35
San Paulo ord.	52	24½	47½

It is realised that a very cautious view of prospects was taken at the last annual meetings, but on the other hand, the prevailing assumption in the market is that there is now likely to be further substantial expansion in U.S.A. demand for Latin-American products, and that in due course this will benefit the traffics of the railways. Compared with a week ago, Great Western ordinary has risen on balance from 42⅞ to 45½ at the time of writing; the 5 per cent. preference was a point higher at 109, and the 4 per cent. debentures showed a similar advance to 111.

L.M.S.R. ordinary, 17⅞ a week ago, has since moved up to 18⅞; the 1923 preference from 50½ to 52½; the senior preference from 67½ to 68½; and the 4 per cent. debentures were two points higher at 105. L.N.E.R. first preference was 2⅛ points up at 51½, the second preference improved further from 19½ to 20, L.N.E.R. first and second guaranteed appreciated to 89 and 79 respectively. Moreover, this railway's 3 per cent. debentures were 78, compared with 76½ a week ago, and the 4 per cent. debentures were 103½, compared with 101½. Southern deferred rallied further from 15½ to 15⅞, the preferred from 63 to 64¼, and the 5 per cent. preference from 105 to 106½. The 4 per cent. debentures were also higher at 110½. In other sections of the railway stock market Canadian Pacific issues again moved better.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1941-42	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1940	No. of Weeks	Aggregate Traffics to date: Totals: This Year	Aggregate Traffics to date: Totals: Last Year	Aggregate Traffics to date: Increase or Decrease	Shares or Stock	Prices: Highest 1941	Prices: Lowest 1941	Prices: Jan. 2 1942	Yield% (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	28.12.41	28,200	+ 8,320	52	1,031,830	899,150	+ 132,680	Ord. Stk.	10⅜	3 11/16	9½	Nil
	Argentine North Eastern ...	753	27.12.41	ps. 132,800	+ ps. 12 500	26	ps. 4,886,400	ps. 4,154,300	+ ps. 732,100	,,	4	1	3	Nil
	Bolivar	174	Nov., 1941	4,690	+ 1,340	48	43,194	42,500	+ 694	6 p.c. Deb.	5	5	7	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	2½	9	Nil
	Buenos Ayres & Pacific	2,801	20.12.41	ps.1,430,000	+ ps.70,000	25	ps.32,635,000	ps. 28,962,000	+ ps.3,673,000	Ord. Stk.	7⅛	1½	6⅜	Nil
	Buenos Ayres Great Southern	5,082	27.12.41	ps.2,655,000	+ ps.470,000	26	ps.57,853,000	ps.50,817,000	+ ps.7,036,000	Ord. Stk.	10½	3½	10	Nil
	Buenos Ayres Western ...	1,930	27.12.41	ps. 755,000	— ps. 73,000	26	ps.21,525,000	ps.17,735,000	+ ps.3,790,000	,,	9	2½	8½	Nil
	Central Argentine	3,700	27.12.41	ps. 1,717,500	+ ps.309,150	26	ps.45,788,550	ps. 36,262,150	+ ps.9,526,400	,,	8½	2½	7¾	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	2½	½	2½	Nil
	Cent. Uruguay of M. Video...	972	20.12.41	24,101	+ 268	25	565,645	508,282	+ 57,363	Ord. Stk.	9½	1	7½	Nil
	Costa Rica	188	Oct., 1941	22,162	+ 6,647	18	91,158	72,735	+ 18,423	Stk.	15½	11½	12	16 11/16
	Dorada	70	Nov., 1941	13,060	+ 1,260	48	136,030	134,200	+ 1,830	1 Mt. Db.	97	97	90½	6⅜
	Entre Rios	808	27.12.41	ps.192,400	+ ps.22,900	26	ps. 7,063,700	ps. 5,776 300	+ ps.1,287,400	Ord. Stk.	6½	5 1/16	7	Nil
	Great Western of Brazil ...	1,016	27.12.41	12,000	—	52	536,900	557,200	— 20,300	Ord. Sh.	11/–	1/–	5/16	Nil
	International of Cl. Amer. ...	794	Nov.,1941	$431.078	+ $79,499	48	$5,097,659	$5,098,199	— $540	—	—	—	—	—
	Interoceanic of Mexico ...	—	—	—	—	—	—	—	—	1st Pref.	⅜	6d.	½	Nil
	La Guaira & Caracas... ...	22½	Nov.,1941	6,925	+ 1,520	22	72,370	72,500	— 130	—	—	—	—	—
	Leopoldina	1,918	13.12.41	27,155	+ 1,680	50	1,321,401	1,160,232	+ 161,169	Ord. Stk.	4⅜	⅛	4	Nil
	Mexican	483	21.12.41	ps. 335,700	+ ps.58,300	25	ps. 7,346,800	ps. 6,665,800	+ ps.681,000	,,	⅜	⅛	⅛	Nil
	Midland of Uruguay ...	319	Nov., 1941	12,157	+ 975	22	66,948	57,186	+ 9,762	—	—	—	—	—
	Nitrate	386	15.12.41	7,484	+ 644	50	140,387	167,048	— 26,661	Ord Sh.	66/–	1 1/16	3½	3 3/16
	Paraguay Central	274	27.12.41	$2,693,000	— $778,000	26	$91,188,000	$88,164,000	+ $3,024,000	Pr. Lt. Stk.	43½	29	42¼	7 1/16
	Peruvian Corporation ...	1,059	Nov.,1941	63,497	+ 353	22	355,843	328,469	+ 27,374	Pref.	6 5/16	1 1/16	5	Nil
	Salvador	100	Oct., 1941	c35,000	— c4,000	18	c191,172	c 165,683	+ c25,489	—	—	—	—	—
	San Paulo	153½	21.12.41	35,312	— 6,646	51	1,870,811	1,865,103	+ 5,708	Ord. Stk.	52	24½	47	4½
	Taltal	160	Nov.,1941	3,340	— 1,275	22	25,330	13,935	+ 11,395	Ord. Sh.	1½	6/–	1⅛	Nil
	United of Havana	1,346	27.12.41	21,755	+ 6,730	26	502,323	385,086	+ 117,237	Ord. Stk.	2⅜	⅜	2½	Nil
	Uruguay Northern	73	Nov ,1941	1,294	— 62	22	6,686	5,631	+ 1,055	—	—	—	—	—
Canada	Canadian National	23,560	21.12.41	1,318,272	+ 201,450	51	59,078,914	47,962,215	+ 11,116,699	—	—	—	—	—
	Canadian Northern ...	—	—	—	—	—	—	—	—	Perp. Dbs.	94⅞	85½	93½	4⅛
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gr.	104 1/16	99⅛	99½	4
	Canadian Pacific	17,137	21.12.41	953,200	+ 160,800	51	42,887,600	33,197,000	+ 9,690,600	Ord. Stk.	13	7⅛	10½	Nil
India†	Assam Bengal...	1,329	—	—	—		—	—	—	Ord. Stk.	—	—	100	3
	Barsi Light	202	20.10.41	3,337	— 165	28	94,500	82,020	+ 12,480	—	—	—	—	—
	Bengal & North Western ...	2 099	Nov.,1941	283,425	+ 15,228	10	528,525	513,931	+ 14,594	Ord. Stk.	345	253	343	4 11/16
	Bengal-Nagpur	3,269	10.10.41	234,750	— 14,924	27	4,993,938	4,533,077	+ 460,861	,,	101½	95⅜	99¼	4
	Bombay, Baroda & Cl. India	2,986	20.12.41	347,325	+ 38,250	38	7,750,125	7,106,700	+ 643,425	,,	98½	92	97¼	6⅛
	Madras & Southern Mahratta	2,939	20.10.41	172,050	+ 26,711	28	4,016,305	3,321,952	+ 694,353	,,	105 1/16	101½	101¼	7⅛
	Rohilkund & Kumaon ...	546	Nov.,1941	49,125	+ 296	10	97,275	95.874	+ 1,401	,,	342	290	338 §	4⅛
	South Indian	2,421	20.10.41	138.643	+ 13,081	28	2,955,174	2,560,855	+ 394,319	,,	100	87	97½	4⅛
Various	Beira	204	Oct., 1941	82,103	—	4	82.103	—	—	—	—	—	—	—
	Egyptian Delta	610	10.10.41	11,017	+ 2,532	27	144,860	98,304	+ 46,556	Prf. Sh.	1½	29/–	2¼	Nil
	Manila	—	—	—	—	—	—	—	—	B. Deb.	68	45	60	5⅛
	Midland of W. Australia ...	277	July, 1941	18,648	+ 7,251	4	18,648	11,397	+ 7.251	Inc. Deb.	90½	85½	89½	6 1/16
	Nigerian	1,900	27.9.41	43,874	+ 12,122	26	1,289,214	923,862	+ 365,352	—	—	—	—	—
	Rhodesia	2,442	Oct., 1941	482.053	—	4	482,053	—	—	—	—	—	—	—
	South Africa	13,291	15.11.41	773,793	+ 74,966	33	24,901,853	22,353,898	+ 2,547,955	—	—	—	—	—
	Victoria	4,774	Aug., 1941	1,046,106	+ 157,817	9	2,001,145	1,757,717	+ 244,428	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of 1/16 Argentine traffics are given in pesos
† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend